

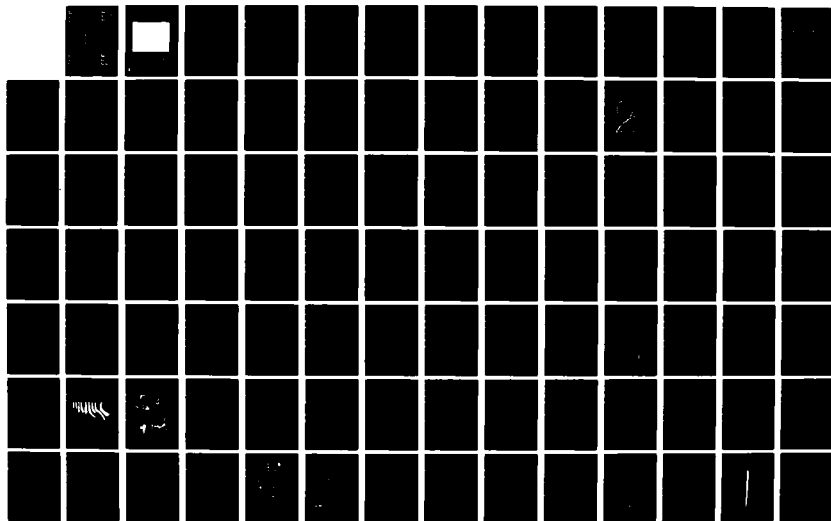
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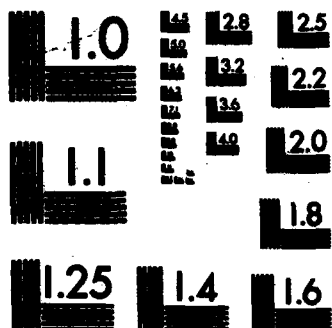
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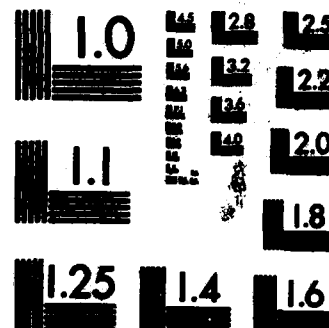
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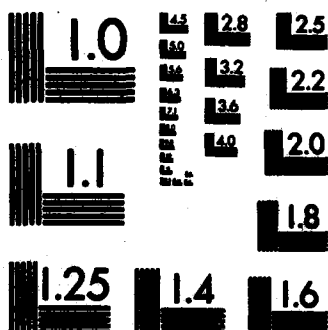




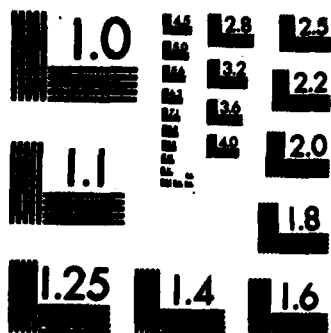
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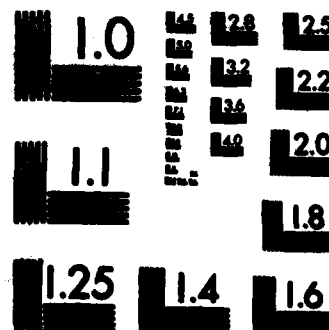
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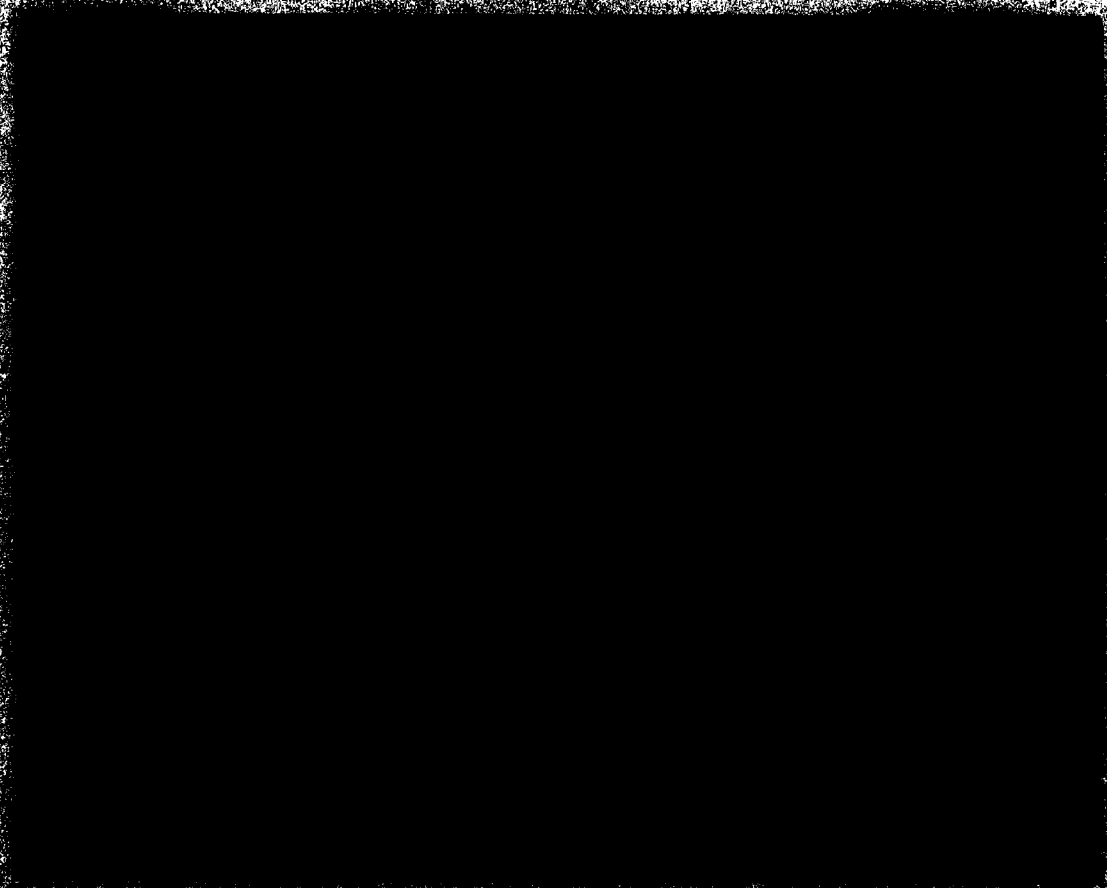


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ARCHAEOLOGICAL INVESTIGATIONS
AT BIG HILL LAKE, SOUTHEASTERN KANSAS, 1960



WILLIAM M. THIES
Kansas State Historical Society
Investigator of
Archaeological Sites

Department of Defense, The U.S. Army Engineer District, Tulsa
Contract Number DACW38-78-C-0161

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ABSTRACT

During the summer of 1980, archeological excavations were carried out by the Kansas State Historical Society at three prehistoric sites located along Big Hill creek in southeastern Kansas. All three sites lie within the conservation pool area of Big Hill lake. The work was conducted under contract with the U.S. Army Engineer District, Tulsa, who provided the funding for the excavations, analysis, and report writing. The rationale for the investigation was based on recommendations from previous archeological testing of the sites and was mitigative in its intent.

The report describes the excavations and the recovered remains, and presents inferential conclusions regarding the activities and cultural affiliation of the sites' prehistoric inhabitants. At 14LT314, the investigation aimed at locating suspected structural remains. None were located and most of the cultural remains were found to be in the plow zone, thus indicating that the site had been essentially destroyed by cultivation. A Middle Ceramic occupation is inferred. At 14LT315, a similar investigation was conducted with somewhat better results. One post mold and a burned rock complex were found, but definite evidence of a structure or house floor was lacking. The scattered distribution of the remains suggested that the site had been disturbed by flooding and associated sedimentation as well as by modern cultivation. Artifacts recovered in the investigation confirmed an earlier inference of a Middle Ceramic, Pomona focus cultural affiliation. At 14LT316, attempts were made to locate structural remains suspected to be present in one area of the site and to excavate as much as possible of a large trash midden known to be present in another area. No definite evidence of a structure was encountered, but artifacts recovered as a result of that investigation confirmed a tentative earlier inference of Pomona focus occupation in that area of the site. Most of the 14LT316 investigation was concentrated in the midden, which contained Cuesta phase artifacts and faunal remains along with charcoal, burned earth, and burned rock. Soil profiles revealed that the midden resulted from the deposition of trash and debris in a shallow gully or ravine. It is assumed that the deposit derives from the occupation of a nearby previously investigated Cuesta house.

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A number of individuals and institutions deserve recognition for their part in the 1980 Big Hill lake investigation. The work was enabled by a contractual agreement with the U.S. Army Engineer District, Tulsa. Thomas A. Witty, Jr., served as principal investigator and provided invaluable direction, advice, and assistance throughout the investigation.

The investigation was immeasurably enhanced by the efforts and skills of one of the best crews with which I have ever had the privilege and pleasure of working. The crew consisted of Jerry William, who served as foreman, and Alan Arbogast, Scott Bowser, Mark Davis, Paul Gleue, Kathy Roseberry, Pam Smith, Bev Yankey, and Kivel Yankey. They performed admirably despite the record high temperatures and excessive aridity of one of the hottest and driest summers ever experienced in southeastern Kansas in recent years.

The fieldwork was facilitated in several different ways by Gary Hunnicutt, the Big Hill project manager. Hunnicutt mowed the head-high vegetation at the three sites investigated and brought out much-needed water to be dumped into the excavation units, thus literally making our work easier. More importantly, he showed a commendable interest in all aspects of the investigation. We thank him for his friendly assistance and encouragement.

Specialized technical assistance was obtained through the efforts of Dr. R.L. McGregor, the Kansas State Biologist, who analyzed and identified the floral remains from 14LT316. Dr. McGregor has aided the Historical Society and other archeological research institutions on several occasions over the past few years, and thus truly deserves recognition for his contributions.

Likewise, recognition is due crew member Jerry William, who analyzed and identified the faunal remains recovered in the investigation. Employed in the Archeology Department laboratory when fieldwork ended, William carried out most of the laboratory processing of the various archeological materials and conducted a preliminary artifact analysis which made my own analyses much easier. I thank him for his cheerful and meticulous efforts.

Preparation of the report was aided by several members of the Archeology Department staff. Diane Good, the laboratory supervisor, facilitated the laboratory processing and along with Don Rowison and John Reynolds provided much-

needed support in the form of advice and editorial suggestions. Department secretaries Belinda Neal and Barbara Tibbitts typed the manuscript in record time. The efforts of all these individuals are much appreciated.

The report was in my opinion greatly enhanced by the illustrations provided by Society staff members Ken Ashworth and Diane Good, of the Archeology Department, and Mary Ann McBride, a former archeologist then working in the Museum. Good completed all the chipped stone illustrations and several of the maps, Ashworth did the sherds from 14LT316, and McBride the sherds from 14LT315. I applaud their skill and thank them all.

Randall M. Thies
1982

FOREWORD

The principal investigator has been involved with the archeological studies of the Big Hill lake project either in an overall or direct supervisory capacity since the initial appraisal survey in 1966. The 1980 archeological investigations in the Big Hill lake area were the last to be conducted before the project became operational. The Kansas State Historical Society has worked under contract with the National Park Service or the Tulsa District, Corps of Engineers on five contracted investigations. There also have been two independent Society surveys as well as one investigation funded by Labette county for the survey of a proposed bridge replacement area. During these studies some 22 prehistoric aboriginal archeological sites were identified on the flood plain or adjacent valley slopes in what has become the Big Hill lake project area. On the basis of the early work and identification of significant sites, the Big Hill archeological district was designated and added to the National Register for Historic Places on November 23, 1977.

Considering the topographic situation of the lake, i.e., a relatively narrow, flat flood plain bordered by steeply sloping valley edges, the configuration of the lake was such that there was little overall areal difference between that of the multipurpose pool and the flood pool. Thus, almost all of the Big Hill sites will be inundated by the multipurpose pool and made inaccessible and/or subjected to potential damage. Thus, specific attention was given through a series of testing and investigative field seasons to ascertain the scientific potential of all these sites and when appropriate carry out specific mitigative investigations.

Considering the relative smallness of the project, the available funding both by the National Park Service and the Corps of Engineers made possible alternating periods of survey and investigations which allowed a more thorough study of the resource. This allowed this project, unlike many of the larger lakes of eastern Kansas, to be investigated to the full extent of the initial recommendations.

Each season of full-scale investigation beginning in 1973 selected the most potential sites for study. The initial major dig, in 1973, excavated four Cuesta lodges at three sites in the lower portion of the proposed lake area. The next season of intensive investigations was in 1978 and was more deductive with the sampling of village areas

between lodge sites and investigating some smaller and more deeply buried components represented for the most part by a small number of exposed features. Thus the 1980 work was left with the more difficult and less initially promising sites and the follow up on a midden area which was partially investigated in 1973.

Each subsequent investigation tested the initial cultural and settlement model proposed from the survey work gaining artifacts and other inferential habitation information to support the earlier identification.

The Big Hill information was also supportive of the model of cultural sequence identified in the larger Elk City lake on Elk river or the Verdigris drainage a few miles to the west of the Big Hill lake. Of particular importance was the obvious contrast of settlement pattern for the Cuesta phase habitation sites. In the Elk City lake these were in a nucleated village situation while the Cuesta phase lodges along Big Hill creek were found to be one of extended community or somewhat isolated households. A Society-sponsored survey carried out in 1980 examined the Big Hill creek valley from the dam axis to the confluence with the Verdigris river. This allowed a catchment study to be carried out demonstrating that river valleys supported somewhat larger populations than those of the lesser creeks.

The findings reported in this paper represent the end of a relatively intensive and extended study of a small portion of the Big Hill creek valley. The significance of the work is in its supportive findings and documentation and thereby preservation of the resources which are inundated by the Big Hill lake.

Thomas A. Witty, Jr.
Principal Investigator

INTRODUCTION

Big Hill lake, located on Big Hill creek in southeastern Kansas (Figure 1), is a man-made multipurpose lake built mainly for flood control. Authorized by Congress under the Flood Control Act approved October 23, 1962, dam construction and lake development began in 1972. Impoundment of the lake waters commenced in the spring of 1981. According to the environmental impact statement prepared by the U.S. Army Engineer District, Tulsa (1973), the lake when full will have a permanent conservation pool covering some 1,240 acres or 502 hectares of land, and a flood control pool which will remain empty except during times of flooding, when up to 280 additional acres (around 113 ha) may be inundated. The top of the conservation pool will be at an elevation of 858 ft (261.5 m) above mean sea level, and the top of the flood control pool at an elevation of 867.5 ft (264 m). The lake will be five miles or eight kilometers long and will be fairly narrow, slightly more than half a mile, or nearly a kilometer, wide. It is owned by the federal government and managed by the U.S. Army Engineer District, Tulsa.

In June, 1980, as the result of negotiations carried on over a period of several months, the Kansas State Historical Society (KSHS) entered into a contractual agreement with the U.S. Army Engineer District, Tulsa, to carry out archeological excavations at three prehistoric archeological sites, 14LT314, 14LT315, and 14LT316, all of which are located in the conservation pool area of Big Hill lake (Figures 2 and 3). All three site areas were to be permanently inundated by the conservation pool and two sites, 14LT315 and 14LT316, were in areas planned for timber clearance. The potential effects of these actions include siltation and possibly damage or destruction from wave action erosion, water currents, and/or soil displacement and compaction caused by bulldozing and the uprooting of trees. At the very minimum, the sites would be inundated and made inaccessible. Recognizing the adverse nature of the impact, and taking into account recommendations arising from earlier archeological investigations of the area, the U.S. Army Engineer District, Tulsa, decided that mitigation by means of excavation would be necessary. Negotiations were therefore carried out and a contract signed. Fieldwork subsequently took place in July, August, and September of 1980, under the direction of the writer and the principal investigator.

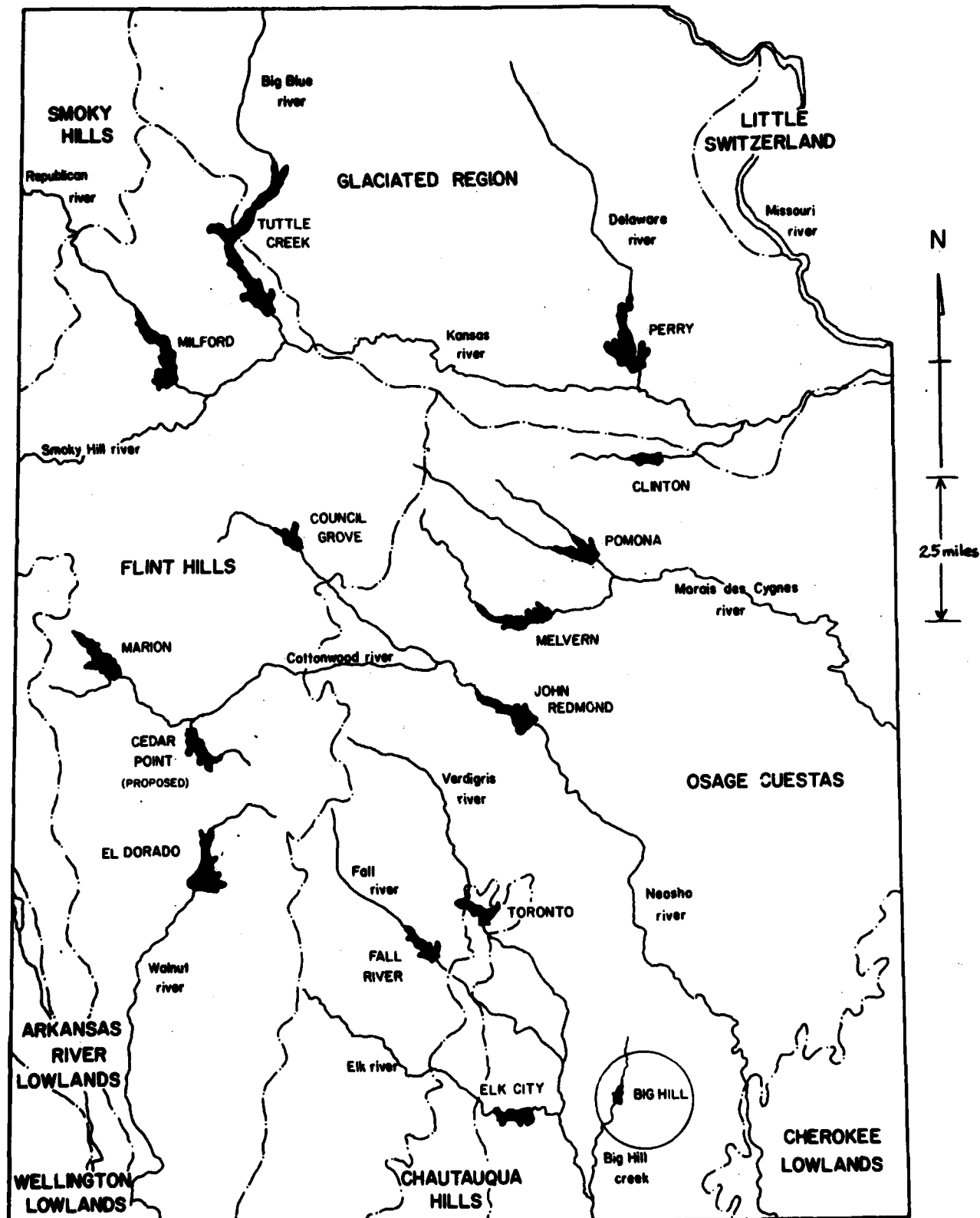


FIGURE 1. Map of the eastern third of Kansas, showing the location of Big Hill lake and related areas.

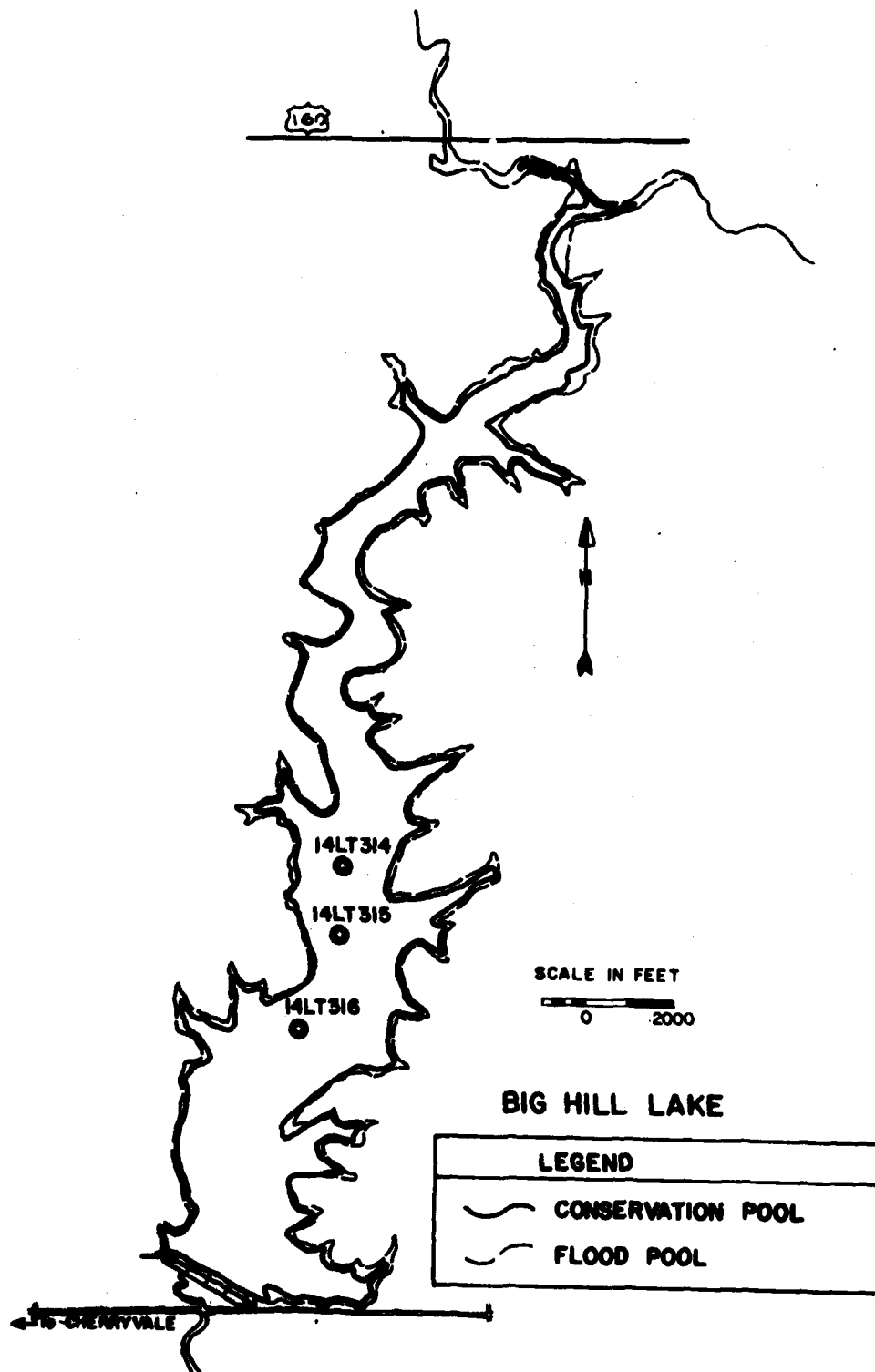


FIGURE 2. Map of the Big Hill lake area, showing the approximate location of 14LT314, 14LT315, and 14LT316.

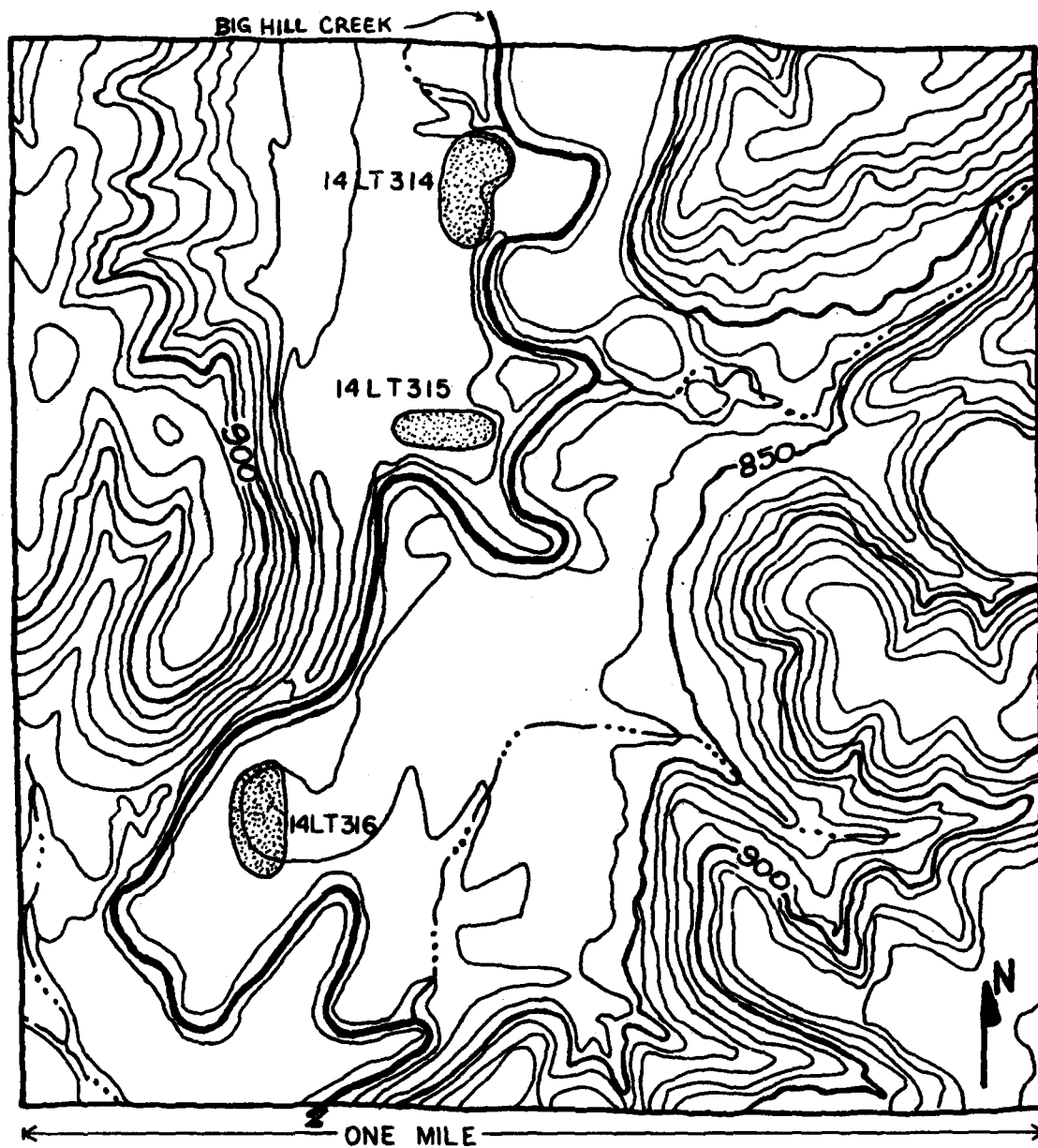


FIGURE 3. Map of Section 5, T32S, R18E, showing the location of 14LT314, 14LT315, and 14LT316. Map is adapted from U.S.G.S. topographic map (Dennis, Kans. 1973 quadrangle).

The fieldwork constituted the second phase of a two phase investigation, the first phase consisting of fieldwork completed in 1978 and reported by Don D. Rowlison of the Historical Society (Rowlison 1980). Thus, the enabling contract for the 1980 investigation was Modification No. 1 of the original 1978 contract number DACW56-78-C-0151. As called for in Modification No. 1, the work carried out in 1980 involved the following:

Excavation of three sites (LT-314, LT-315, and LT-316), using standard excavation techniques based on either stratigraphic or arbitrary levels as appropriate. The sites shall be photographed and mapped. Artifacts collected during the investigation shall be washed, catalogued, and analyzed. Samples shall be collected for ph, pollen, soil, Carbon-14, faunal, and archeobotanical analyses where possible. All sites shall be restored as closely as possible to their pre-excavation condition.

In addition, the modification stated that all fieldwork was to be completed by September 30, 1980, and that a letter notifying the Engineer District of the completion of that work, along with a summary of the field activities, was to be provided by October 30, 1980. Both of these requirements were complied with. All the records, maps, photographs, and specimens produced during the field season have since been processed and filed at the Kansas State Historical Society building in Topeka.

Analysis and reporting of the data deriving from the 1980 investigation were contracted for in the latter part of 1981 by means of Modification No. 2. The modification defined the scope of services as follows:

This modification requires the analysis and reporting of data recovered during the 1980 excavation of sites LT314, 315, and 316. The analysis shall consist of an interpretive synthesis of the data and analytical results of the Phase I and II investigations. It shall include where possible paleo-botanical, -zoological, radiocarbon, and palynological studies, to be conducted by acknowledged specialists.

Modification No. 2 also set out various requirements relating to the content of the report. Basically, the report was to present clearly and accurately the results of all work conducted under the basic contract and under

Modification No. 1, including an explication of research design. The text was to include a description and interpretation of total site data, along with photographs and/or graphics showing details of features, profiles, artifacts, and other evidence of human occupation. DD Form 1473, containing an abstract suitable for publication in an abstract journal, was to be included as a title page. The draft report, scheduled to be submitted for review not later than 240 calendar days from the date of award of the modification, was to be a polished product and an accurate representation of the content of the final report. The final report was to incorporate review comments submitted by the COR (committee of review) and was to be reproduced according to various specifications detailed in the modification. Finally, a brief, nontechnical summary of the excavation results and their significance, oriented toward the nonprofessional public and written in a style and length adaptable to a newspaper article or short information bulletin, was to be prepared and submitted separately from the final report.

THE ENVIRONMENTAL SETTING

Physiographically, Big Hill lake lies within the Osage Cuestas division of the Osage Plains section of the Central Lowlands province of the Interior Plains division of North America (Schoewe 1949). The Osage Cuestas region is characterized by relatively low relief, with the overall flatness of the landscape being relieved by the presence of long, low, easterly facing escarpments or "cuestas" formed by the exposure and consequent erosion at the ground surface of alternating beds of limestone, shale, and sandstone. All of the bedrock is of Pennsylvanian age. The strata dip gently to the west and northwest, thus creating a series of parallel ridges with gently sloping western faces and steeply sloping eastern faces. The resultant topography is one of long, low, rolling hills and wide, shallow valleys.

Within the Big Hill lake vicinity, the terrain is semirugged with wooded hills and sharply defined escarpments. Erosional remnants, or cuesta outliers, known popularly as "mounds," are common throughout the uplands and sometimes rise more than a hundred feet above the level of the surrounding terrain. Relief from streambed to mound top is usually not over two hundred feet.

The Big Hill lake area, and indeed the entire state, enjoys a continental climate characterized by warm summers with abundant sunshine, cold dry winters, strong wind movement, and wide variations in temperature and precipitation (Flora 1948). The mean temperature for the lake area is about 59° Fahrenheit, with record extremes ranging from minus 31° F to a plus 121° F. Average rainfall is about 38.4 inches (96 cm), with most of the yearly rainfall occurring from May through September. The summer rains usually occur as thunderstorms of short duration and limited extent, but with intense rainfall. The winter rains are generally of low intensity, but cover large areas and are of several days duration. The prevailing wind is from a southerly direction, with the greatest wind movement occurring in the spring months.

Hydrologically, Big Hill creek is, of course, the major stream course in the project area. The creek rises in Neosho county, Kansas, and flows in a south-southwesterly direction for nearly 57 miles to its confluence with the Verdigris river immediately upstream of Coffeyville, Kansas. It has cut a relatively narrow valley, only 1,800 ft (590 m) wide at the dam site. Within the lake area, the valley attains a maximum width of about a half mile (954 m). The

meandering creek channel is generally 10-12 ft (3-4 m) deep and about 75 ft (24.6 m) wide, with a capacity of about 1,500 cubic feet per second in the vicinity of the dam. Due to the clayey nature of the soils and the fact that a large portion of the drainage area is pastureland, the creek carries a relatively small sediment load.

Creek flow in Big Hill creek ranges from zero during dry periods up to an estimated 9,000 cubic feet per second during wet periods. Due to the limited channel capacity and the narrow nature of the valley, major seasonal flooding is common, often resulting in the inundation of the entire valley. According to Table 3-1 of the environmental impact statement (U.S. Army Engineer District, Tulsa 1973), the known and postulated rates of creek flow indicate that stream flow is greatest during the first half of the year, particularly March, April, May, and June, and least during the second half, particularly August, September, and October. The statistics provided within the environmental impact statement also indicate that for the 41-year period 1929 through 1970, stream flow at Big Hill dam site would have exceeded the flood stage an estimated 65 times under natural conditions (1973:3-2). At the other extreme, drought would have caused periods of low stream flow lasting, on at least one occasion, some 1,840 days.

These statistics obviously have implications in regard to prehistoric human habitation of the valley. Camps on terraces and high alluvial ridges would be safe from most floods, but even the highest bottomland locations would be flooded once in a while. On the other hand, flooding would result in a variety of ecological benefits such as the trapping of fish in oxbow lakes and the creation of marine habitats suitable for molluscs and migratory waterfowl. Areas of silt deposition and disturbed soil would likewise create an ideal habitat for the growth of edible plants such as lambsquarter, marsh elder, pigweed, and others. In drought years, however, the potential for human habitation of the valley would obviously be adversely affected by the low to nonexistent stream flow of the creek.

Flooding is also known to have had an effect on the preservation of Big Hill archeological sites. In some cases sites have undoubtedly been buried and thus protected; others have been literally destroyed and their remains deposited elsewhere along with quantities of silt. A case in point, observed and reported by Society archeologist Don Rowilson, is the "...devastating..." flood of July 1976 which raked the Big Hill creek valley and inundated the basin for several days, subjecting several recorded

archeological sites to sheet erosion (Rowlison 1977:28). In at least one case (14LT307), flood waters stripped the then-existing plow zone, removing some 20 cm of top soil and resulting in the secondary deposition of site materials in locations away from the actual site area (Rowlison 1977:71).

Three major plant communities were present in and around Big Hill lake prior to impoundment: an upland woods, consisting of scattered stands of oak-hickory forest located on rolling uplands and prairie hilltops; a bottomland forest, made up largely of elm, ash, and cottonwood trees and confined to the flood plain of the creek and its tributaries; and a tall grass prairie, made up of bluestem grasses and other herbaceous grasses (U.S. Army Engineer District, Tulsa 1973:2-7). The flora of the region in the prehistoric and early historic periods can be ascertained by reference to botanical studies, early historical accounts, and soil survey data. In all cases, the picture obtained is one of open prairie penetrated by thin ribbons of riverine deciduous forest. Kuchler (1974), for example, lists the Osage Cuestas as part of the tall grass prairies, and describes it more specifically as an area with extensive interspersions of forest and prairie. Wedel has described the region's prehistoric vegetational pattern as follows:

In their original state, the Osage Plains were primarily a tall grass prairie, with big bluestem dominating the rolling plains between streams and much of the valley bottoms as well. The immediate stream banks and adjacent valley floors were heavily timbered with oak, black walnut, elm, linden, sycamore, locust, hickory, pecan, and other hardwoods. Smaller forms that undoubtedly entered into the native economy of the Indians included Osage orange or bois d'arc, persimmon, papaw, elderberry, serviceberry, chokecherry, and wild grape (1959:14).

Wedel points out elsewhere that Kansas occupies a transitional zone climatically intermediate between the humid East and arid West, and has for that reason long been subject to climatic fluctuation of greater or lesser magnitude (1959:7). At the same time, it is clear that the grasslands are not a recent development. In fact, the present evidence indicates that the vegetative and faunal characteristics of the Kansas landscape "...long antedate man's demonstrable presence on the scene" (Wedel 1959:8). Buried soils indicate the presence of grassland in Kansas throughout the Pleistocene, and molluscan fossils point to a

climatic control like the present one since mid-Wisconsin times (Wedel 1959:8). In short, it can be assumed that prehistoric human occupation of the Big Hill reservoir area took place in an environmental setting much the same as that seen today.

Faunal resources of various kinds were supported by the environmental conditions just mentioned. Wedel, speaking of the Osage Plains in general, describes the situation as follows:

The forested belts and nearby prairies provided shelter and food for an abundant mammalian fauna, chief among which were elk, white-tailed and mule deer, black bear, cougar, wildcat, timber wolf, gray and red fox, raccoon, opossum, the gray, fox, and flying squirrels, beaver, otter, muskrat, and cottontail rabbit. On the prairies were bison, coyote, antelope, jackrabbit, badger, and many smaller mammals. Among the numerous birds, the plentiful wild turkey was doubtless of primary importance to man; but prairie chicken, ruffed grouse, and quail were also useful, and the passenger pigeon and Carolina parakeet were present. The larger streams, usually running clear and unsilted, yielded an abundance of edible fish and shellfish (1959:14).

Early historical accounts from travelers and settlers in southeastern Kansas provide evidence in support of these views and serve to lend color to the facts. The writer Washington Irving, for example, in 1832, while traveling through present-day Neosho and Labette counties, wrote of passing over a "...vast prairie..." where "...not a tree or shrub was to be seen--a view like that of an ocean..." (McDermott 1944:98-100). Arriving at a stream which was probably Labette creek, located a few miles above the Neosho river, Irving noted the presence of "Fine trees..." and "...wood entangled with rich underwood..." (McDermott 1944:98-100). A few years later, in 1840, a French medical student, Victor Tixier, described the area between the Neosho and Verdigris rivers in present-day Labette and Montgomery counties in similar terms. According to Tixier, the prairie was "...a huge sea of grass spotted by islands of woods, where a series of round hills rise like waves. A hill, a plain cut by a river with wooded banks, then plains, hills, and more plains as far as the horizon...The prairies which extend to the Arkansas river have tall grass, and fine

forests where creepers and horse beans grow in dense thickets" (McDermott 1940:158).

The general and indeed pervasive absence of trees on the prairie, except in protected situations in stream courses or on hills, was apparently not due entirely to purely climatic factors. As one early Labette county settler wrote, in 1867 "Not a tree was to be seen except on each side of the Neosho river, small wonder when the yearly prairie fires are considered" (quoted by Rowlison 1980:24). Nor was the absence of trees due entirely to natural causes, since many of the prairie fires had a cultural origin. Washington Irving, for example, in 1832, upon observing the "...columns of smoke hanging lazily in various directions of the horizon..." wrote further that they were "...kindled by Indians to drive the game to the Prairies" (McDermott 1944:98-100).

Soil survey data fully bears out these various views and accounts of a basically prairie environment. Different types of soils have long been recognized as reflecting soil formation under different kinds of vegetation. The characteristics of a forest soil, for example, are quite different from those of a prairie soil, even if all other soil forming factors are the same. And due to the length of time and vegetative stability under which mature soils must develop, soil survey data can be regarded as providing one of the few reliable means for inferring prehistoric environments.

Soil surveys undertaken in the early part of this century in Labette county (Knobel, Von Trebra, and Higbee 1926) and Montgomery county (Emerson and Waldrop 1916) differentiated the soils in the area into two basic groups. They include (1) residual soils, formed in the uplands under prairie vegetation and typically developed from the weathering of limestone, shale, and sandstone bedrock, and (2) alluvial soils, formed in river and stream valleys under forested conditions and developed from recent, Holocene-age alluvium. Colluvial soils, deriving from erosion and crumbling of the valley edges, are also present but are of very minor extent. Unfortunately, the soil survey data presently available is not informative as to the past spatial extent of the upland forest community. In fact, however, this absence of data constitutes "negative evidence" which clearly reflects the minor extent and fluctuating nature of that plant community in the past.

Soil survey data is especially useful to the prehistorian, since it can be used to quantify the nature and exploitive potential of specific prehistoric environments.

In the case of the three sites that are the subject of this report, soil survey data has been used in conjunction with site catchment analysis to determine the nature of the ecological setting within which the occupants of the sites operated. Site catchment analysis, a methodological approach based on ethnographic studies of modern agricultural and hunting and gathering economies, assumes that "Other things being equal the further the land is from the site the less likely it is to be exploited from it" (Jarman, Vita-Finzi, and Higgs 1972:62). Drawing upon the data produced by the studies, the distance covered in two hours' walking time (ca. six miles or eight to ten kilometers) is postulated as the "...critical threshold..." for hunting and gathering economies, and one hours' walking time for agricultural exploitation (Jarman, Vita-Finzi, and Higgs 1972:63). Beyond these limits, the costs of exploitation rise to oppressive heights and the home base has to be moved. Thus, the territory exploited from a site, i.e., the site catchment, tends to lie within certain well-defined and therefore predictable limits.

Figure 4 illustrates the 14LT316 site catchment as determined from the available soil survey data. The site catchments of 14LT314 and 14LT315 are centered about a kilometer to the north-northeast and are essentially identical with the 14LT316 catchment. All three sites are located in the bottomland on alluvial terrace formations adjacent to Big Hill creek. As is apparent in Figure 4, the site catchment consists of a wide expanse of prairie cut through by thin ribbons of riverine bottomland forest. Quantitatively, the upland prairie soils make up 94 percent of the site catchment and the bottomland forest soils 6.0 percent. At least in gross comparative areal terms, the prairie obviously constitutes the most abundant resource potential.

In reality, however, and to elaborate and reiterate the information already given, the riverine area provided a more extensive and diversified resource base and was probably much more intensively exploited than the surrounding upland prairies. In terms of floral resources, the uplands may have had such things as the prairie turnip, a dependable and dietetically valuable source of sustenance exploited to a variable degree by prehistoric groups (Kaye and Moodie 1978), but the prairie-forest interface could be depended upon to produce a whole variety of fruit and berry bearing shrubs, while the forest furnished edible fungi and nuts and the portions of the bottomland subject to flooding provided a number of edible and highly productive plants such as sunflower, lambsquarter, smartweed, pigweed, ragweed, and marsh elder. Various migratory waterfowl, turtles, fish,

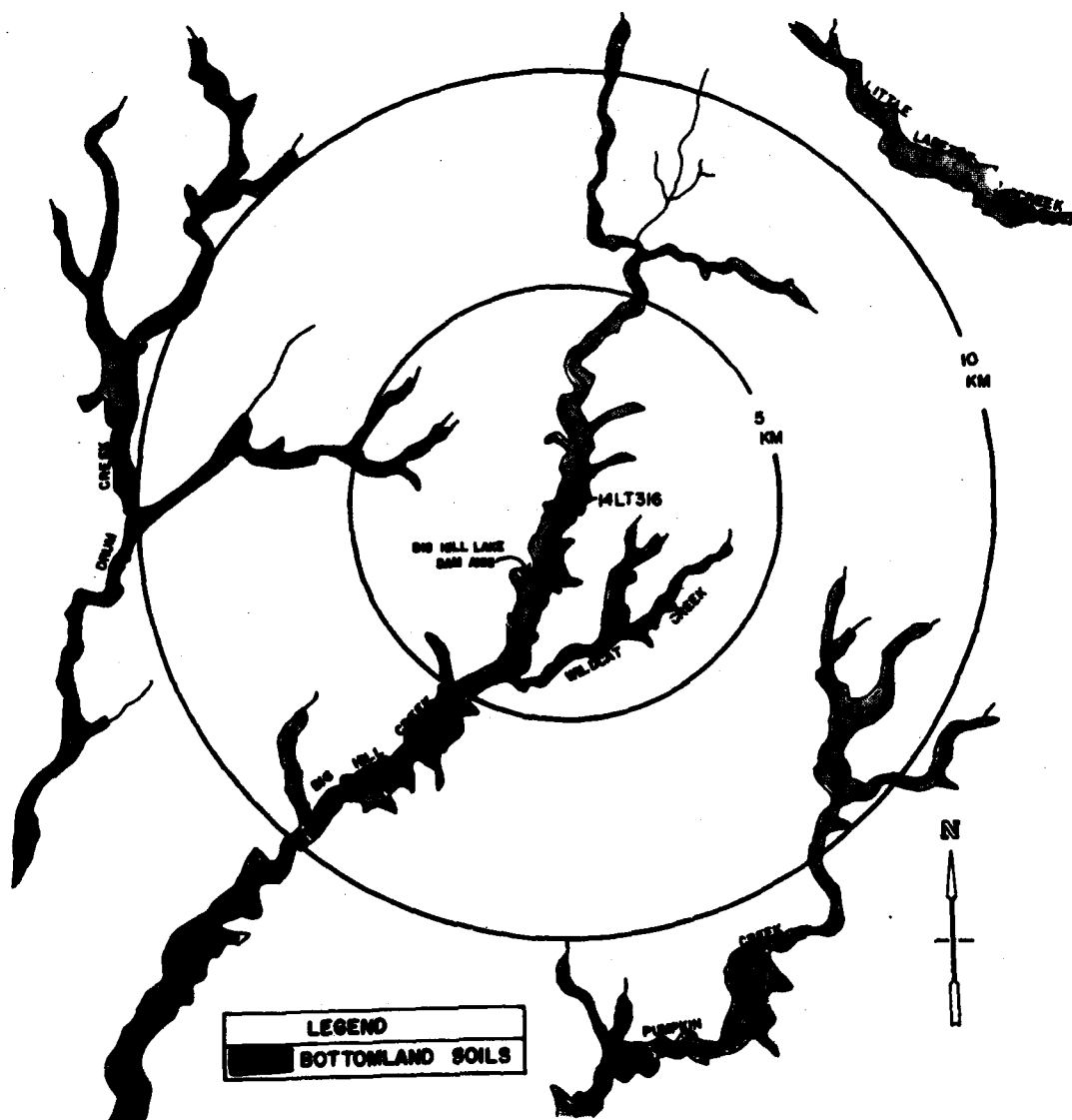


FIGURE 4. Map of the 14LT316 site catchment.

and edible molluscs were also present in the riverine area, along with mammals such as beaver, muskrat, and otter. Deer, bear, opossum, raccoon, and other mammals would have been available in forested areas in and along the edges of the creek valley.

Seen in this light, the exploitive potential of the 14LT316 site catchment, with its 6.0 percent bottomland area, appears to be somewhat impoverished in comparison with that of certain other sites in the region. For example, the site catchment of the Infinity site, 14MY305, the large Cuesta phase village and type site on the Elk river, in Montgomery county, had a 14 percent bottomland area, and 14MY1374, another large Montgomery county Cuesta phase habitation site, located on the Verdigris river, had a site catchment with 22 percent bottomland (Brogan 1981b:76). As pointed out by Brogan (1981b:69-77), the difference in exploitive potential could well account for the apparent difference in Cuesta phase settlement patterns, with large, complex, nucleated villages developing in the relatively resource affluent river valleys and standing in contrast to the isolated houses and less populated scattered or extended villages in the less affluent creek valleys.

THE CULTURAL-HISTORICAL SETTING

The culture history of the Big Hill lake area, in terms of both the lake area proper and the region as a whole, has been described in detail by Rowlison in two separate reports to the Corps (c.f. Rowlison 1977:9-28 and 1980:11-26). For that reason, the present report is confined to a more summary treatment of the regional culture history. However, since the three sites investigated in 1980 have been identified as representing two specific archeological entities, the Cuesta phase of the Early Ceramic time period and the Pomona focus of the Middle Ceramic period, those entities will be described in some detail within the present report. Readers desiring a more comprehensive treatment of the regional culture history, especially as regards the historic era, are urged to consult Rowlison's reports.

Judging from the existing evidence, it is clear that eastern Kansas has been occupied intermittently, if not continuously, since the end of the Pleistocene glaciation some 12,000 years ago. Unfortunately, the record is somewhat fragmentary and certainly incomplete, being based on evidence of a minimal nature quite often found in secondary rather than primary archeological context. The extant evidence has permitted the identification of certain general cultural periods. It should be noted, however, that temporally there was overlap of cultural stages within the overall region. Consequently, the temporal units should not be equated with cultural stages, but should be regarded as classificatory guides which make discussion possible.

PRECERAMIC CULTURES

The earliest known occupations of the Plains, and the ones about which the least is known, occurred during the Paleo-Indian period, beginning about 12,000 years ago. Paleo-Indian sites are primarily identified by the presence of large, lanceolate-shaped projectile points, usually fluted, occasionally found in association with the remains of now-extinct Pleistocene megafauna such as mammoth and mastodon. The sites are often kill locations, where animals were slain and butchered. It is assumed that small bands or family units comprised the basic mode of social integration. At least some of these groups had dogs, as evidenced by dog remains excavated from Paleo-Indian context in Idaho, radiocarbon dated at over 11,500 years old (Butler 1968:39). Unfortunately, Paleo-Indian manifestations in eastern Kansas have so far been limited to occasional surface finds of

projectile points, such as were reported from John Redmond reservoir some 70 miles to the northwest of the Big Hill area (Rogers 1979:6). No such finds have been reported in the Big Hill area, and no Paleo-Indian sites have yet been identified, in Kansas, with the potential for providing the basis for intensive investigations.

Climatic fluctuations associated with the end of the Pleistocene glaciation are thought to have been influential in bringing about changes and the development of the next distinctive preceramic cultural tradition or time period, the Archaic, which began as early as 8,000 B.C. in some areas of the Plains and continued, at least in Kansas, until around the beginning of the Christian era. The climatic changes coincided with the extinction of the large Pleistocene fauna and the development of a drier, warmer climate, a climate somewhat hotter and more arid at the outset than that experienced today.

A seasonally shifting subsistence/settlement system, more regionally oriented and hence less nomadic than the Paleo-Indian mode of exploitation, apparently constituted the Archaic way of life. Archaic groups continued to be hunters, but the fauna they hunted consisted of the modern forms of bison, elk, and deer. A reliance on plant foods, particularly grains and other seeds, is suggested by the appearance of stone grinding slabs during this time period. It is possible, in fact, that such plants as the sunflower and marsh elder were cultivated by Archaic groups (Yarnell 1976:266).

The Archaic artifact inventory differed from that of the Paleo-Indian in several ways. Ground stone items, such as axes, celts, gorgets, and beads, made their appearance in the Archaic along with the grinding slabs previously mentioned. Chipped stone axes and celts were also produced. Projectile points continued to be made of chipped stone, but more diversified forms were manufactured. Archaic points retained the lanceolate shape but not the fluting of Paleo-Indian points, and were often stemmed, or notched on the side, corner, or base. And while many of the Archaic projectile points were as large as those of the earlier time period, a significant number were smaller, displaying a trend towards diminutiveness which continued into the late prehistoric.

The Archaic period is a great deal better represented in Kansas than the Paleo-Indian, with several distinct cultural manifestations having been identified. One of the earliest radiocarbon dates reported in Kansas, 3,600 B.C.,

was produced from charcoal taken from a hearth in the lower levels of 14LT319, a site in Big Hill reservoir (Rowlison 1977:118). Unfortunately, no diagnostic artifacts were recovered from the level, which constitutes the only definitely identified Archaic manifestation in the reservoir. A similar date of 3,650 B.C. was obtained from charcoal taken from a stone hearth at 14EK331, a site in Elk county a short distance northwest of Elk City reservoir (Barr 1974:30). A nearby and presumably associated trash midden at the site yielded projectile points of the Graham Cave side notched or Osceola, Uvalde, and possibly Plainview types (Barr 1974:22-25).

An earlier radiocarbon date of circa 4,335 B.C. was obtained from a charcoal lense at the Coffey site in Tuttle Creek reservoir in the northern Flint Hills (Schmits 1978:85). Dates from other levels of the Coffey site indicate that it was used for a series of short-term seasonally occupied base camps during the Archaic, beginning around 5,270 B.P. (Schmits 1978:85, 157). Munkers Creek knives, Clear Fork gouges, and lanceolate projectile points of the Nebo Hill and Sedalia types were present in those levels along with grinding slabs and several hearths. Ceramic evidence was surprisingly present as well, in the form of one fired clay bead recovered from a level dated at circa 5,163 B.P. (Schmits 1978:124).

The Munkers Creek phase defined by Witty (1962:2, 1982:218-228) is of much the same degree of antiquity, having yielded a date of 3,390 B.C. (Witty 1964:5, 1982:188, 200) from the William Young site at Council Grove reservoir in the Flint Hills. Even more interestingly, the Archaic zone at the site yielded what are among the oldest modeled ceramic artifacts on the Plains: two small triangular-shaped effigy heads, made of fired clay (Witty 1962:5 and Figure 2, 1982:124-126). Diagnostic Munkers Creek artifacts, including some very distinctive chipped stone knives which often display a high gloss or polish (Witty 1982:150-158), have been found all along the eastern edge of the Flint Hills.

Evidence of a more informative nature was obtained at John Redmond reservoir, some 70 miles northwest of the Big Hill area, during the excavation of the stratified Williamson site, 14CF330. The Late Archaic, El Dorado phase component at that site yielded radiocarbon dates of 1,650 B.C. and 1,550 B.C., along with two adult female burials and a dog burial, and burned stone concentrations interpreted as representing hearths and/or boiling stone dump areas (Witty 1963:8; Schmits 1980:13-66). It is intriguing to note that

an apparently older component was located under the excavated Archaic level at the site. Unfortunately, it could not be investigated due to the impoundment of the reservoir and the consequent flooding of the area.

At approximately the same distance from the Big Hill area, in the upper Verdigris watershed in Greenwood and Lyon counties, two apparently Late Archaic sites have been identified. While no artifacts were recovered from either site, charcoal from deeply buried hearths yielded radiocarbon dates of approximately 1,830 B.C. at 14LY305 and 1,300 B.C. at 14GR307 (Calabrese 1967:12-13). At a much closer distance to Big Hill, only about 20 miles west in the Elk City reservoir vicinity, similar evidence was obtained from a feature identified as a deeply buried Archaic hearth at 14MY309. Charcoal from the hearth, which was unaccompanied by any artifacts, yielded a radiocarbon date of approximately 1,730 B.C. (Marshall 1972:99).

Another preceramic manifestation which deserves mention is the Afton complex, found in portions of southeastern Kansas, northeastern Oklahoma, southwestern Missouri, and northwestern Arkansas (Wood 1961:88-90). This complex is best distinguished by the presence of distinctively made Afton points (Bell 1958:6), but the Afton tool assemblage also includes stone choppers, knives, cobble manos, and some bone and antler implements. Bundle burials in earthen and stone mounds have also been discovered in affiliation with the Afton complex (Wood 1961:88-90, 115).

CERAMIC CULTURES

The Archaic tradition, as currently understood, came to an end on the Plains around the beginning of the Christian era, apparently the result of the diffusion of new technologies, adaptive strategies, and probably social systems, from the Eastern Woodlands. Pottery making is the most archeologically obvious of the technological advances. Primarily for this reason, post-Archaic cultural manifestations have come to be grouped together under the classificatory term, Ceramic cultures (Champe 1946). A growing use and eventual acceptance of the bow and arrow comprises another major technological change occurring in the Ceramic period. In terms of subsistence/settlement systems, the introduction of cultigens and the development of agricultural food production were likely of great importance in influencing how and where people lived.

The Ceramic era has come to be divided into three sequential periods, termed the Early, Middle, and Late

Ceramic (Champe 1946). The beginning of the Early Ceramic, in Kansas, is marked by actual migrations of people, as well as the diffusion of ideas, from the Eastern Woodlands. The earliest and certainly the best known of these migrations is represented by settlements centered in the Kansas City area and known archeologically as Kansas City Hopewell. According to Wedel, Kansas City Hopewell is "Probably the most advanced and complex of the Woodland manifestations of the Kansas region..." (1959:542), although "...clearly a watered-down version..." (1961:89) of the Middle Woodland Hopewellian cultures of Illinois and Ohio from which it derived. It is of particular interest in that it represents the first evidence, on the edge of the Plains, of a people whose subsistence rested in part on the cultivation of domestic crops; corn and beans having been recovered from the excavations at the Renner site in present-day Kansas City, Missouri (c.f. Wedel 1943:26).

Few sites outside of the Kansas City area have been specifically identified as Kansas City Hopewell, although Kansas City Hopewell remains have been found to the west, primarily along the Kansas river drainage, in scattered village sites and burial mounds. It is worth noting, therefore, that sherds with Kansas City Hopewell characteristics have been recovered from two sites in the John Redmond reservoir area (Thies 1981:33; and Jones and Witty 1980:83-87). At one of the two sites, 14CF343, a relatively large ceramic figurine, depicting a human figure from the waist up, was also found and identified as Kansas City Hopewell. It is uncertain, however, whether the material derives from actual occupation by Kansas City Hopewell groups, or from trade or some other kind of contact with such groups.

Another Early Ceramic cultural manifestation strongly influenced by the "classic" Hopewell and Havana traditions of the Eastern Woodlands is the Cuesta phase, a taxonomic unit defined by Marshall (1972:225-230). The Cuesta phase is of particular importance to the present study since it is concentrated in southeastern Kansas, being best known from surveys of the Big Hill area and the Verdigris, Fall, and Elk river drainages.

Sites excavated in the Elk City reservoir vicinity have revealed the remains of somewhat complex and durable nucleated Cuesta phase villages containing relatively large, oval to circular-shaped houses. The houses were randomly distributed and closely grouped. Judging from the widely spaced post molds and the absence of abundant burned earth or daub, the houses were apparently covered by a material lighter than earth or sod. Midden areas have also been

identified at the Elk City villages, indicating occupations of relatively long duration. Excavations of the middens have yielded household debris, pottery, and stone tools, as well as the skeletal remains of two human infants and two dogs. The recovered faunal remains indicate a reliance on woodland mammals such as deer, beaver, and raccoon. Other animals represented are bison, rabbit, turkey, and both terrestrial and aquatic types of turtles. Deer bones constitute most of the identified bone sample, followed by turtle, beaver, bison, dog, raccoon, and rabbit (Marshall 1972:230).

Excavations in the Big Hill lake area have also produced evidence of Cuesta phase occupation, but one with a different settlement pattern consisting of isolated houses and/or scattered, extended villages. In all other respects, the houses in the Big Hill area were apparently quite similar to those excavated at Elk City, and middens were also found. As mentioned previously in this report, the difference in exploitive potential between the large river valleys and the smaller creek valleys is thought to account for the difference in the intensity of settlement (Brogan 1981b:69-77). On an overall basis, it is evident that the Cuesta phase subsistence base relied primarily on woodland fauna, with the remains of prairie fauna such as bison being "...sparse in relationship to the total faunal inventory..." (Brogan 1981b:76).

The lithic tool assemblage encountered at Cuesta phase sites is relatively quite diversified, with chipped stone artifacts in particular representing a large variety of forms and sizes. Projectile points are predominantly medium to large in size and contracting stemmed or corner notched in shape, although smaller corner notched points of the Scallorn type are also common. Also present are medium to large sized, ovate or triangular-shaped, thin, plain or stemmed bifaces used probably as cutting tools or knives, along with thicker ovate or triangular-shaped pieces probably used for chopping. Drills and scrapers occur in a variety of shapes and sizes. The ground stone inventory includes grinding slabs and mullers, axes and celts, and ornaments such as gorgets and pendants. Bone and shell were also utilized, apparently on a limited basis, for the making of tools, utensils, and ornaments.

The Cuesta phase ceramic inventory consists of indurated clay tempered pottery easily differentiated from the grit tempered Kansas City Hopewell wares. The Cuesta vessels are usually medium to large in size and elongated in shape, with wide orifices, slightly constricted necks,

steeply sloping shoulders, and conoidal bases. Exterior surfaces are usually smooth. Decoration typically consists of tool impressions, dentate stamping, punctations, and/or embossing, with the decorative elements usually confined to the lip or contained within trailed or incised zoning lines located along the rim or upper body of the vessels. "Crack lace" holes are also common. Cuesta sites have yielded a small number of Havana ware sherds with distinctive Middle Woodland characteristics (Marshall 1972:47-49). Stylistically, Cuesta phase pottery exhibits some Havana characteristics but corresponds more closely to Weaver ware, a Middle or Late Woodland pottery ware (c.f. Griffin 1952:121-122; Wray and MacNeish 1961) of the Eastern Woodlands and Prairie/Plains fringe. The Weaver-like characteristics of Cuesta ware suggest a somewhat later temporal positioning for Cuesta phase than for Kansas City Hopewell. The only available radiocarbon dates for Cuesta phase, ca. A.D. 780 and A.D. 970, from the Infinity site in Elk City reservoir (Marshall 1972:230), tend to corroborate this inference.

Other Early Ceramic manifestations of interest to the present study include the Plains Woodland Greenwood phase of east central Kansas (Witty 1982:207-218) and the Middle Woodland Cooper focus of northeastern Oklahoma (Bell and Baerreis 1951:27-33). Both manifestations have yielded artifact assemblages roughly comparable to that of the Cuesta phase. In terms of pottery temper, however, the three groups can usually be easily differentiated, the Greenwood phase pottery being in part tempered with crushed and/or burned limestone and the Cooper focus pottery with crushed sand and/or grit. Sherds from the Cooper site, the Cooper focus type site on the Grand or Neosho river, are similar to those associated with Kansas City Hopewell (Baerreis 1953); moreover, the sites with Woodland affiliation in northeastern Oklahoma are generally considered to represent a southern extension of Middle Woodland Hopewellian traits from the northern and middle Mississippi valley through Missouri and Kansas, an extension which would presumably include Cuesta phase manifestations. The Greenwood phase, by way of contrast, is considered to be a distinctly Plains Woodland manifestation, apparently less influenced by events in the Eastern Woodlands (Reynolds 1979:84, 93-96). It has long been clear, however, that there was temporal overlap as well as cultural diffusion between the Middle Woodland Hopewellian groups and the Plains Woodland populations (Wedel 1959:554-557).

Another, apparently non-Woodland, manifestation in existence during the Early Ceramic period is the Gibson

aspect, which followed the Woodland cultures in northeastern Oklahoma. The relationship of the Gibson aspect to the earlier Woodland cultures is not clear at this time (Baldwin 1969:71), and the available radiocarbon dates point to a rather late A.D. 700-1000 time frame (Wyckoff 1964:3), roughly contemporaneous with Cuesta phase. According to Wedel, Gibson aspect represents a series of sedentary, village-dwelling people whose populous communities were often centered around temples or ceremonial structures on platform mounds (1961:137). Gibson aspect sites are characterized by clay tempered pottery, small projectile points, and ceremonial centers with earthen mounds (Wyckoff 1964:3; Baldwin 1970:5).

By approximately A.D. 1000, cultural changes through adaptation and diffusion brought about new lifeways and population groupings which are identified archeologically as being within the Middle Ceramic period. The Middle Ceramic manifestation most important to the present study is the Pomona focus, first defined by Witty (1967). The Hart site, 140S305, located in Melvern reservoir, is the type site for the focus (Wilmeth 1970:18-56). The majority of the known Pomona sites are concentrated in the east central portion of the state, in parts of the Dissected Till Plains and eastern Flint Hills and throughout most of the Osage Cuestas. Pomona focus groups evidently did not range far to the east into present-day Missouri, but centered further west, entering the Missouri area only on a temporary and occasional basis (Chapman 1980:81-82). Temporally, Pomona focus radiocarbon dates range from A.D. 1000-1600 (Witty 1967:4, 1978:62).

A major determinant of Pomona focus habitation sites are the remains of one or more structures which had been covered with thatch and plastered over with clay. Relatively lightweight structures, roughly oval in shape and usually about 25 ft long (ca. 7.6 m) and 15 ft wide (ca. 4.6 m), are indicated by widely spaced and irregularly located post molds. Major portions of these structures were plastered over with clay, judging from the abundance of grass impressed and pole impressed fired clay daub found at these sites. The causal factor involved in the firing of the daub is uncertain, although prairie fires are one possibility and deliberate firing another. Wilmeth asserted that there must have been repeated use of fire fairly close to the center of the house to account for the baking of the roof covering in that area (1970:25), but features clearly identifiable as interior hearths are usually lacking in Pomona houses (Witty 1967:2, 1978:60).

In terms of settlement pattern, "...extended community relationships..." have been suggested, an inference drawn from the archeologically documented presence of single or paired Pomona houses, occasionally even up to four houses, situated along low terraces or on natural levees on the valley floor from a few hundred yards to almost a mile apart (Witty 1978:70). Recent investigations in John Redmond reservoir have augmented these studies, providing evidence that the Pomona settlement pattern involved an extensive use of the uplands at the edges of the valleys, use which may have equalled or excelled their use of the valley floors (Thies 1981:288). To draw upon an idea of Kivett's (1970:95) concerning Woodland groups in Nebraska, it appears most likely that seasonal movements were the normal state of affairs, with Pomona occupations taking place on the flood plains in the winter and at higher elevations during the summer, when the valley floor was subject to flooding.

Pomona focus burial practices are best known from the Wiley site in Melvern reservoir. The cemetery complex at the Wiley site consisted of 15 flexed burials, often with limestone slabs laid over the top of the grave pits. Mortuary goods in the forms of pottery vessels and chipped stone tools were also present with the burials (Moore and Birkby 1964:18-24).

A burial in a pit outside a wattle and daub house at the Clinton phase Anderson site in Clinton reservoir near Lawrence may also be indicative of Pomona burial practices, although the Clinton phase groups were interpreted as having had their own distinctive cultural pattern sharing characteristics of both the Central Plains complex and Pomona focus (Johnson 1968:136-137). The Anderson site burial consisted of a pit containing a few fragments of bone representing the remains of two individuals, an adolescent and an infant. The burial was interpreted as deriving from secondary placement rather than primary burial (Johnson 1968:35).

Pomona burials, or possible Pomona burials, are also known from two sites in the Elk City lake area. At the Infinity site, 14MY305, the poorly preserved skeletal remains of a single individual, probably a male, were found (Marshall 1972:32). The remains were tentatively considered to be part of Component A, identified as a Pomona manifestation (Marshall 1972:233-238). If incorrectly attributed, they are almost certainly part of Component B, a large Cuesta village. The remains were basically uninformative due to the general lack of preservation, but various indicators revealed that the individual was around 17.75 years of age at the time of death, with an estimated height of 155.55

cm (5 ft, 1½ in.). The skeleton was in a flexed position, lying on its right side and oriented southwest-northeast. No burial pit was discernible and no diagnostic artifacts were in association.

At 14MY335, also in the Elk City lake area, two human burials were found (Marshall 1972:204-206). Both skeletons were in a poor state of preservation, and burial pits were not discernible. One skeleton was that of an adult, lying in a semiflexed position oriented north and south with the head pointed to the north. The other skeleton was that of an infant, lying in a semiflexed position at the head of the adult and oriented in an east-west direction with the head pointing towards the west. The site is considered to be a Pomona manifestation (Marshall 1972:233), but a partially restorable vessel recovered in part from within the burial excavation (Marshall 1972:210-211) has many of the characteristics of the Verdigris pottery type (c.f. Calabrese 1967:58-60), thus suggesting a connection with the Greenwood phase of the Early Ceramic. The vessel is tempered with crushed limestone and indurated clay and has a smoothed-over cord-roughened exterior. Morphologically, it has a weakly defined shoulder and a conical base.

Pomona sites are usually evidenced by a ceramic inventory typically consisting of small to large sized globular-shaped jars with unsmoothed, all-over cord-roughening. Rims are usually straight to outflaring in form, although a significantly large number of channelled or thickened collared types were also made. The vessels usually have well-defined necks and prominent shoulders. Decoration is usually either lacking or minimal, consisting in the main of tool impressions located on the lip of the rim. Tempering material almost invariably consists of indurated clay or weathered shale particles, particles which may be naturally occurring within the clay. Crushed bone was also used on a limited basis in conjunction with the indurated clay and/or shale. A few specimens of shell tempered Pomona pottery have also been found (e.g., Thies 1981:227).

The Pomona projectile point inventory primarily includes small, thin, triangular forms with single or double side notches and occasionally single basal notches, although significant numbers of small corner notched and larger corner notched and stemmed points are found as well. In some cases, such as the Slough Creek site at Council Grove lake in the Flint Hills, the small, thin, notched triangular forms are not present at all (Witty 1982:31-32).

Knives at Pomona sites are generally triangular, although the diamond-shaped, alternately beveled knife is

fairly common. Celts are usually chipped but occasionally exhibit minor grinding. Grinding slabs and mullers, and loaf-shaped, grooved arrowshaft abraders typically comprise the ground stone tool inventory. Very few bone or shell artifacts have yet been reported for Pomona focus, probably reflecting at least in part the low potential for preservation of faunal remains in eastern Kansas, due to the climate and the acidic soils. However, two bone hoes made from bison scapulae have been found or interpreted from remains at two Pomona sites, the Slough Creek site in Council Grove lake and the Winn site on Wolf creek in Coffey county, Kansas (Witty 1982:34; and Rohn, Stein, and Glover 1977:88, respectively).

The cultural and taxonomic relationships of Pomona focus groups with the apparently contemporaneous Central Plains tradition populations to the north and the earlier Plains Woodland and Middle Woodland cultures of the area remain uncertain. In terms of shared traits with earlier cultures, the daub that is such a characteristic aspect of Pomona habitational structures is also commonly present in Grasshopper Falls phase sites, perhaps indicating a derivative relationship. Pomona pottery vessels exhibit Middle Ceramic morphological characteristics while containing temper (or natural inclusions) of indurated clay almost identical to that seen in the paste of Cuesta phase and some Greenwood phase pottery vessels. Sherds of the Greenwood pottery type, having all the characteristics of Pomona ware, have been found occurring "...stratigraphically together..." with Verdigris type sherds of the Plains Woodland Greenwood phase at the Curry site in Greenwood county (Calabrese 1967:75; Reynolds 1979:94-95). Likewise, the partially restorable vessel found in association with the two human burials at 14MY335 in the Elk City lake area has Greenwood phase Verdigris ware characteristics, although the site itself has been interpreted as a Pomona manifestation on the basis of the overall artifact inventory and a radiocarbon date of A.D. 1190 (Marshall 1972:224, 233). On the other hand, Pomona pottery with characteristics obviously indicative of Mississippian influence has also been found, notably at the Keen site in the Perry lake area of northeastern Kansas (Nickel 1973:38-59). In terms of projectile point styles, Pomona point assemblages are clearly Middle Ceramic judging from the predominance of small, thin, triangular points, but a definite, albeit muted, Early Ceramic affinity is reflected by the smaller numbers of stemmed and corner notched points.

Spatial and temporal relationships are equally interesting. In terms of spatial distribution, Pomona focus is

distinctly different from Central Plains tradition, centering instead within the general territorial boundaries of the earlier Grasshopper Falls, Greenwood, and Cuesta phases. In the northern part of the state, Pomona sites appear to extend northward between the Central Plains tradition Nebraska phase sites along the Missouri river and the most easterly Smoky Hill aspect sites in the Vermillion and Blue river drainages. Temporally, the available Pomona focus radiocarbon dates suggest a significant overlap between the Early Ceramic and Middle Ceramic periods.

The evidence for subsistence patterns is also interesting. As mentioned, two bone hoes have been found, but with the exception of the Winn and Anderson sites on Wolf creek in Coffey county, where corn and beans were found (Rohn, Stein, and Glover 1977:88-90), there is a general paucity of actual physical evidence for Pomona agriculture. By way of contrast, there is abundant evidence for cultivation at Central Plains tradition sites. Judging from the faunal and floral remains thus far excavated from Pomona sites, most of the Pomona had a hunting/gathering economy not much different from that practiced by Early Ceramic groups.

The current interpretation of the situation is that Pomona focus represents an indigenous population adapting from and in part maintaining a basically Plains Woodland lifestyle while accepting some of the Middle Ceramic Plains Farmer technological advances. Witty, for example, postulates that Pomona focus represents "...a late survival of...Plains Woodland folks," representing, therefore, "...a late Plains Woodland manifestation with some shared traits from the adjacent Central Plains peoples" (1978:62). Or, as Marshall has put it, using a taxonomic framework developed for the Eastern Woodlands, the Pomona focus can be considered to be a "...Late Woodland complex..." occupying "...a spatial position between and temporally concurrent with the...Central Plains and Mississippian complexes" (1972:242-243).

One last archeological manifestation of the Middle Ceramic period, the Neosho focus, should be mentioned in this survey of prehistoric cultures pertinent to the Big Hill area, although the relationship of Neosho focus to Pomona focus, if any, is unknown at present. The Neosho focus is a northeastern Oklahoma manifestation, a part of the Fulton aspect, a group of "...somewhat simpler cultures..." (Wedel 1961:138) which succeeded the earlier Gibson aspect. One characteristic feature of Fulton aspect and Neosho focus remains is the frequency of shell tempered pottery. According to Wedel, the Neosho focus remains show

"...marked resemblances to some of the Plains materials from southern Kansas..." and it "...seems possible that some of the putatively Wichita remains in southern Kansas have roots in the Fulton aspect or in immediately following cultures of eastern Oklahoma..." (Wedel 1961:138).

At any rate, the Middle Ceramic cultures in Kansas were apparently ended, or at least transformed, by a series of severe droughts which occurred around A.D. 1500. It is thought that most, if not all, of the Central Plains groups migrated northward into Nebraska and South Dakota and settled along the Missouri river, becoming in time part of the Coalescent tradition (Lehmer 1954). The archeological record is uncertain, however, as to the ultimate fate of Pomona focus groups at the end of the Middle Ceramic. While several of the other Middle Ceramic groups can be identified with later, protohistoric, tribal groups on the basis of historical documentation and/or archeological inference, the same can not be said for Pomona.

The period following the end of the Middle Ceramic is known as the Late Ceramic or Protohistoric. This period essentially consists of the time just prior to, during, and after the initial contact between native American Indian groups and the first Europeans. For this reason, protohistoric sites are occasionally found to contain items of European derivation, even though the site may not have actually been visited or recorded by Europeans. The Protohistoric is important in being the first period for which recorded history can be used to identify artifact assemblages and archeological manifestations with historic tribal groups.

Perhaps the best example of this connection is the "Quivira" peoples who met Coronado and his men in 1541. The Quivira have been identified archeologically as the Great Bend aspect and culturally as the Wichita tribal group of central and south central Kansas (Wedel 1959:630). Isolated artifacts ascribable to the Great Bend aspect have been identified as far east as the Toronto and John Redmond reservoirs in east central Kansas (Howard 1964:336-338; and Thies 1981:47, respectively). More important in terms of the present study, it is quite possible that a large and apparently fortified village site known as the "Neodesha Fort," located on the Verdigris river only 15 miles northwest of the Big Hill reservoir area, represents the remains of a sizable Great Bend aspect or Wichita community dating probably from the early eighteenth century (Wedel 1959:526-534). Unfortunately, most if not all of the site's elaborate earthworks were destroyed by farming operations

and industrial development beginning in the early 1900s. It has therefore not been possible to properly investigate and document this site, which apparently represents the easternmost extent of Great Bend aspect settlement.

The protohistoric subsistence/settlement pattern was apparently much the same but probably of far greater efficiency than that of the preceding period. Surplus is implied by more numerous and larger storage pits. Horticultural activities centered on the familiar corn/beans/squash triad, although the gathering of wild foods continued to be of importance. Bison hunting was actively engaged in by means of two annual, seasonal hunts, which often involved most of a group's population. Portable structures such as tipis were utilized on the hunts.

The protohistoric settlement pattern thus included temporary bison hunting camp sites as well as large, compact villages with semipermanent lodges, auxiliary structures, specialized activity areas, and extensive storage pits. Protohistoric peoples in the far west, however, such as the Dismal River/Plains Apache, were much more involved in hunting than horticulture and consequently left fewer remains of a sedentary nature. Archeological traits characteristic of the Late Ceramic period include small, plain, triangular projectile points, pottery vessels whose surface treatment consists of smoothing and/or simple stamping, and a variety of bone tools including bison scapula hoes with the distal articulation surface removed, adze-shaped scraper handles made from elk antler, scored ribs, and arrowshaft straighteners made from bison ribs. Towards the end of the Late Ceramic, however, the quality of the artifacts declined sharply, as European-manufactured goods came into use.

HISTORIC CULTURES

The historic period begins, in Kansas, in A.D. 1541 with Coronado's journey to the "Quivira" villages, identified archeologically as Great Bend aspect and culturally as protohistoric Wichita. The villages visited by Coronado were reportedly located just beyond the big bend of the Arkansas river, and are currently believed to be in the vicinity of Lyons and Lindsborg, where scraps of chain mail armor, as well as datable Puebloan pottery sherds, have been found in Great Bend aspect sites (Wedel 1959:319-320). Interestingly, the accounts of one of the later Spanish expeditions indicate that facial tattooing and painting were quite common among the "Quivirans;" in fact, the Puebloan Indians called them the painted or tattooed Indians (Wedel 1959:22).

By the early 1700s, the Wichita had apparently abandoned their territory and moved far to the south, in Oklahoma and Texas. Historical documents hint at the Neosho river drainage being an important part of the Wichita habitat as late as the eighteenth century, but according to Wedel, in view of the bitter warfare waged against the Wichita all through that century by the Osage, the Neosho river in Kansas would seem to have been a most undesirable locality for permanent Wichita towns, certainly by the latter part of the century (1959:67). This undesirability would presumably apply to Big Hill creek, judging from its close proximity to the Neosho, some 20-25 miles away.

At any rate, following the withdrawal of the Wichita sometime during the 1700s, eastern and central Kansas were apparently used primarily by the Kansa, living in the north part of the state, and the Osage, living in the south. Historical documents indicate the Osage to be the primary Indian tribal group associated with the southeastern Kansas area during the protohistoric and historic periods. Originally located in west central and southwestern Missouri along the Osage and Little Osage rivers, the Osage had probably been in contact with Europeans, primarily French explorers and traders, since 1673 (French 1851:62). Their first recorded visit by a European took place in 1719, when a Frenchman, Claude Charles du Tisne, obtained horses from them in Missouri for his trip further west. Du Tisne commented on the Osage as follows:

This nation is not stationary like the Missouris, but spent the winter in hunting buffalo. They are stout and well-made, and great warriors. Their chiefs are absolute in their villages...They are not civilized, but are accessible by making them a few presents (French 1851:67).

By 1820, most of the Osage had drifted out of Missouri, resettling along the Neosho river in Kansas, evidently in what is now Neosho and Labette counties, and along the Verdigris river in Oklahoma (Wedel 1959:56). In 1825, they ceded the lands they claimed in Missouri, Arkansas, Indian Territory, and most of Kansas, reserving a strip 50 miles wide and some 75 miles long beginning 25 miles west of Missouri and running west along the southern boundary of Kansas (Abel 1904:77). Their villages at this time are thought to have been scattered along the Neosho river from present-day Oswego, Labette county, upstream to approximately Erie, Neosho county (Wedel 1959:57). The Osage were able to hold on to their lands along the Neosho until 1865,

congregating for a short time thereafter in villages along the Verdigris. In 1872, faced with growing pressure from white settlers and other factors, they finally gave up their lands in Kansas and moved a few miles south to a new reservation in Indian Territory.

Throughout the history of the Osage there was a group known as the Big Hill band. These people moved to the Neosho/Verdigris rivers area of Kansas sometime between 1822 and 1839. Pa-I'n-No-Pa-She [Not-Afraid-of-Longhairs], Governor Joe or Big Hill Joe as he was known by the white men, was the leader of a village known as Big Hill (Mathews 1961:690, 698). This village was supposedly located a few miles northwest of the mouth of the stream now known as Big Hill creek (Barry 1972:945).

There are several interesting historical accounts concerning the Osage's sojourn in Kansas. Washington Irving and Charles Latrobe visited and wrote about the Osage in 1832, as did Victor Tixier, a French medical student, in 1940. A trading post, owned and operated by John Mathews, who was married to an Osage, was established at the present site of the town of Oswego in 1841. Government agents were also sent to the area, and an Osage Catholic Mission was established in Neosho county beginning in 1847. Bishop Miege, visiting his diocesans in 1852, noted that the Osage villages were "...all built on heights within a comfortable reach of wood and water...everything perfectly clean" (Barry 1972:1110). Tixier's 1840 observations (McDermott 1940: 116-117) concerning the "...primitive elegance..." of the bark and mat covered Osage lodges are perhaps the most interesting from an archeological and anthropological perspective. His comments concerning an Osage village near Oswego read as follows:

Neion-Chou is composed of about thirty roomy huts irregularly laid out. The smaller ones, which are less numerous, are built in the shape of a cone and their tops have a narrow opening to release the smoke. The single opening, closed by a buffalo skin or reed mat lowered during the night, looks out toward the east. The larger ones, from forty to fifty feet long, from fifteen to eighteen feet high, and about twenty feet wide, are shaped as parallelograms, on top of which is a semi-cylindrical roof with two openings, one at each end, corresponding to the location of the fires inside. These huts are entered through two doors on the southern part of the two sides, which always

correspond to the east and west (McDermott 1940:116-117).

Euro-American settlement of the southeast Kansas area and the Osage reservation lands commenced, albeit illegally, even before the Indians were removed to Oklahoma in 1872. In the late 1850s, for example, there was some settlement by squatters in Labette and Neosho counties. A county organization was attempted in 1859, but the effort failed. In 1860, all settlers on Osage lands were declared trespassers, and in October and November of that year federal troops were sent in to remove them. Many of the crops, fences, cabins, and stock were destroyed by the troops to discourage any immediate rehabilitation. In all probability, however, the purposes of the destruction of the squatter improvements were twofold, one purpose being to remove the trespassers and the other to discourage the proslavery element in southeastern Kansas.

During the Civil War, most of the inhabitants of Labette county were driven out either north or south by actions of the opposing factions. After the war, settlement of southeastern Kansas proceeded in earnest as veterans and their families moved into the area from the east. Labette county, organized in 1867, was settled primarily along the Neosho river and Labette, Big Hill, and Pumpkin creeks. One of the first settlers in Osage township, in which Big Hill reservoir is located, arrived in the fall of 1866. Many settlers moved into the township in 1867, and by 1868 a school and a store had been established. Several town companies were formed to commercialize the township in the late 1860s and early 1870s, but none met with any long-term success. Agrarian settlement continued, nevertheless, and expanded over the years that followed.

PREVIOUS ARCHEOLOGICAL INVESTIGATIONS

The three sites that are the subject of this report were recorded in 1972 as the result of an Historical Society survey of the Big Hill lake area. The reservoir area has undergone several surveys of varying intensity, beginning in 1966. Southeastern Kansas in general has been given sporadic professional attention over the years, primarily in connection with the construction of federally funded reservoirs.

Aboriginal manifestations were recognized in Labette county as early as 1866, when Dr. T.A.H. Lowe encountered a set of petroglyphs carved in sandstone. The carvings were on the faces of two slabs which were set parallel, 10-13 ft long and from 2½ to 3½ ft wide. The top edges of these slabs formed an angle of approximately 45 degrees. Aboriginally carved figures were reportedly present on the outer faces of these stones, along with names of European origin (Remsburg 1912:122). The exact location of these slabs is not known at present.

About 10 years later, in 1876, materials were reportedly collected from an aboriginal site along Pumpkin creek, approximately eight km (five miles) southeast of Big Hill reservoir. The materials, apparently prehistoric, were furnished for display in conjunction with the 1876 World's Fair in Philadelphia (O'Connell 1977).

Probably the first published reference to the archeology of southeastern Kansas is found in an article printed in the January 14, 1893 issue of American Crank. The article (Newton 1893) describes several village sites located along the Neosho river in eastern Labette county, making mention of such things as storage pits, grinding slabs, nutting stones, midden deposits, surface debitage, associated burial areas, pottery, etc. Both prehistoric and historic aboriginal sites were reported to be present.

Professional attention was first given to the area in the 1930s or shortly before. Moorehead, writing in his Archeology of the Arkansas River Valley, noted that a number of village sites had been reported along the Neosho by W. Stout prior to 1931 (Moorehead 1931:84). Moorehead also reported (1931: Figure 75) the presence of "Treaty Rocks," a petroglyph site on a hilltop overlooking Big Hill creek and the Verdigris river valley near Liberty, in Montgomery county, about 10 miles southwest of Big Hill lake. The petroglyphs, later visited and described by Wedel

(1959:492), include "...two or possibly three war-bonneted horseback riders, a number of small bored holes that tend to occur in pairs, paired elliptical hollows suggesting deer tracks, etc." Wedel also reported the presence of a boatstone in the national collections from a mound near Oswego, in Labette county, noting that it could have an Archaic or early Woodland affiliation (1959:557). Similar specimens were observed in private collections from the vicinity of Independence, in Montgomery county (Wedel 1959:557).

One of the first organized archeological surveys in the area was conducted in 1951 under the auspices of the University of New Mexico. The one-man survey was of a limited nature, consisting primarily of inquiries and interviews with local landowners and tenants. Thirteen archeological sites, all located in Montgomery county, were recorded as a result of the survey (Varner 1951).

Beginning in 1961, several seasons of work were carried out by the Kansas State Historical Society in the Elk City lake area near Independence in Montgomery county. Survey, testing, and several major excavations were conducted in the early 1960s, followed by one season of survey and testing in 1978. By late 1978, 103 prehistoric archeological sites had been identified within the lake locality (Brogan 1981a:57). The sites produced artifact assemblages and cultural features representing a variety of cultures ranging from Archaic and Early and Middle Ceramic up to and including historic Osage habitations of the nineteenth century. The Elk City fieldwork was particularly important in permitting the definition of a previously unrecognized Early Ceramic manifestation, termed the Cuesta phase (Marshall 1972:225-230).

The Big Hill lake area underwent its first professional archeological investigation in 1966, when a survey was carried out by James Marshall of the Kansas State Historical Society working under a cooperative contract with the National Park Service. The survey resulted in the identification of nine archeological sites that would be threatened by construction activities and/or inundated by reservoir impoundment. Three of the sites were of uncertain prehistoric cultural affiliation; the other six were tentatively identified as Early Ceramic (Marshall 1966).

Further survey of the Big Hill lake area was carried out in 1972-1974 by Society archeologist Tom Witty, resulting in the identification of 10 additional sites, including the three that are the subject of this report: 14LT314,

14LT315, and 14LT316. All three were discovered through consultations with local informants, particularly the Robert Hanley family, who lived in the uplands along the edge of the valley just west of 14LT314 and who had collected from all three sites over the years. Other more limited surveys of opportunity were conducted along the Big Hill drainage during 1973 and 1974, resulting in the locating of more diagnostic artifacts at known sites and the identification of several previously unreported sites. Most of the remains were identified as representing Early or Middle Ceramic occupations.

Excavations were carried out in the Big Hill lake area by the Kansas State Historical Society in 1973 as the result of a cooperative agreement with the National Park Service. The investigation consisted of 11 weeks of work at three sites, one of which was 14LT316, one of the sites that are the subject of this report. Four Cuesta phase lodge floors were exposed during the investigation, one at 14LT316. The artifact assemblages and associated features--stone filled hearths, shallow pits, widely spaced post mold patterns, large houses with associated midden areas, etc.--were essentially identical with Cuesta phase manifestations previously discovered at Elk City lake some 20 miles to the west of Big Hill. The investigation was of particular importance in that it permitted the recognition of a different Cuesta phase settlement pattern than that at Elk City. Cuesta phase manifestations at Elk City consisted of somewhat complex and durable nucleated villages; at Big Hill, the settlement pattern consisted of isolated houses and/or scattered, extended villages. Site catchment analysis suggests that differences in exploitive potential and hence in carrying capacity between the large river valley and the smaller creek valley account for the differences in intensity of settlement (Brogan 1981b:69-77).

The Historical Society returned to Big Hill in the summer of 1976 as the result of a contractual agreement with the U.S. Army Corps of Engineers, Tulsa District. The investigation was primarily intended to provide the Corps with a cultural resource assessment relating to the significance to the various sites and their need for further work. Eighteen prehistoric sites were thereby tested by a small crew directed by Society archeologist Don Rowilson. Sixteen of the sites were investigated by means of scattered excavation units of various sizes; the remaining two were tested with the use of an Oakfield soil sampling tool. Three of the sites tested by excavation are those that are the subject of the present report: 14LT314, 14LT315, and 14LT316. Those three and six other sites were recommended

for further work as a result of the investigation (Rowlison 1977:136-138). The 1976 efforts were significant in several ways, in pointing out the potential for further work, in documenting the presence of a 5,550-year-old Archaic manifestation (one of the oldest dated sites in Kansas), and in providing further evidence and information relating to Early and Middle Ceramic occupations of the valley, including the possibility of a Pomona variant.

In 1978, the Historical Society returned to Big Hill, again under the auspices of a contractual agreement with the U.S. Army Corps of Engineers, Tulsa. The investigation (Rowlison 1980) was primarily intended to salvage cultural data from dam-vicinity sites which would be destroyed by construction activities. The fieldwork, carried out under the direction of Don Rowlison, involved the investigation of three sites tested in 1976 (not including the three that are the subject of this report) and one newly reported site discovered in 1977 during a county road project. Relatively extensive excavations were conducted, consisting of both hand-dug excavation units and machine-dug trenches. Unfortunately, the sites failed to produce any significant new data, although complementary information was obtained relating to Early Ceramic occupations and further evidence was found as part of the Archaic manifestation investigated in 1976.

Following the 1978 investigation, no further work was done in the Big Hill lake area per se, other than an occasional brief survey of opportunity conducted by Society personnel traveling through the area. However in early 1980, just prior to the excavations that are the subject of this report, the Historical Society sponsored a three-man, week-long survey of the lower reaches of Big Hill creek, extending downstream from the dam site some 33 stream miles to the creek's confluence with the Verdigris river. The purpose of the survey, carried out by Society archeologists William T. Brogan, Don D. Rowlison, and the present writer, was to gather additional data on the Cuesta phase settlement pattern system. The results of the survey together with interpretations of the data have since been reported by Brogan (1981b). Due to varying vegetational conditions, only selected high-potential portions of the drainage were examined; nevertheless, the survey resulted in the locating and recording of 20 previously unreported sites. The sites were interpreted as representing habitations from the Late Archaic, Middle Woodland (Early Ceramic), Middle Ceramic, and possibly Late Ceramic periods. Three Cuesta phase components and three Pomona focus components were specifically identified.

RESEARCH METHODOLOGY

The fieldwork involved in the 1980 Big Hill investigation consisted of excavations at three sites, 14LT314, 14LT315, and 14LT316. Prior to beginning the excavations, the site areas were reconnoitered by the writer and Society archeologist Don Rowlison, who had directed the testing carried out in 1976 and participated in the 1973 excavations at 14LT316. Rowlison pointed out the location of previously excavated areas and the areas of known or suspected high potential, thus immeasurably aiding the initial aspects of our investigation since most traces of the previously excavations had been obscured by subsequent cultivation. Moreover, all three of the sites were covered by a dense growth of weeds and grass at the time of our arrival in late June. The vegetation was subsequently cut by Corps of Engineers personnel working out of the Big Hill lake office.

All through the summer, excavation was made difficult by the extreme hardness of the soil, the result of two seasons of drought. Water was therefore hauled, on occasion, to fill the excavation units and thus soften the soil. Hand tools, primarily shovels and trowels, were employed in carrying out the excavations. The soil was generally removed in 10 cm increments, or "levels," by means of systematic vertical-oblique shoveling or horizontal shovel skinning. Arbitrary levels were used since no real stratigraphy was apparent. Screening of the excavated fill dirt (through quarter-inch steel mesh) was carried out on an opportunistic basis, that is, whenever it was found or thought to be productive in terms of artifact recovery. In most cases, screening did not produce much in the way of material and was therefore discontinued in favor of careful shoveling and troweling.

Locational grids consisting of square-shaped units were established at all three of the sites investigated. Excavation units measuring 2 m² (four square meters) in size were employed at 14LT314 and 14LT315. At 14LT315, randomly located test pits 45 cm² in size were dug in addition to the more specifically located excavation units. At 14LT316, the grid consisted of 3 m² units. At A802, 14LT316, these units were eventually subsumed into 6 m² excavations to facilitate the prompt exposure of a large area.

Area and feature designations were made in a manner first developed at the University of Nebraska and described by Champe (1948). Using this system, the area investigated is given a three digit number with the first two digits representing the last two digits of the year and the third

digit representing chronologically the area examined. Area 801, or A801, for example, represents the first area investigated at a site in 1980, A802 represents the second, and so on. At Big Hill, the area designations were necessary to differentiate the areas investigated in 1980 from those investigated in earlier investigations.

Any notable observation or find encountered during the investigation was designated a feature and given a feature number. Thus, artifacts such as stone tools and pottery sherds as well as nonportable remains such as post molds, soil stains, and burned rock or charcoal concentrations were awarded feature status and recorded upon prepared record forms indicating the nature and location of the feature. Feature numbers were derived from the particular page number on which the feature was located, with each set of record forms for each site being consecutively numbered. While this system does not produce the consecutive numbering of features present in other recording systems, it permits a convenient indexing between feature and record. Later triplication of the record sheets allows for one set to be filed by record number, a second set by day, and a third by subject, e.g., features, progress reports, etc.

The research design for the 1980 investigation was of a fairly simple and straightforward nature deriving directly from the obligations stated in the enabling contract and the recommendations engendered in previous investigations. The contract called for archeological excavations at three specific sites, and was basically mitigative in its intent. Since the sites were to be destroyed or made inaccessible by reservoir development, the investigation was essentially "salvage" archeology (c.f. Silverburg 1967) aimed at recovering whatever data was present at the sites. In this sense, the investigation was basically inductive although focused on deductive matters such as the presence and nature of postulated structural remains.

At 14LT314, 14LT315, and A802, 14LT316, excavations were initially begun in and around the locations where post molds had been found in 1978, with the major goal being to locate a house floor or post mold pattern. When no structural evidence of this sort was found in those locations, the excavations were expanded or scattered further out in an attempt to recover a representative artifact assemblage and to locate any other remains (hearths, activity areas, trash pits, etc.) which may have been present. Excavation efforts were supplemented by the use of the Oakfield soil sampling tool, a simple, hand-operated, probe-type apparatus which can remove intact a soil core an inch in diameter and a foot

in length and which can be used to extract soil samples from depths of up to several feet below surface. Soil probing of this type enables an appraisal of subsurface conditions by revealing the presence or absence of charcoal, burned earth flecking, and other such cultural indicators. The tool was used on the surface of the sites to identify the horizontal limits of the deposits, and within the excavation units to check for deeply buried deposits previously unnoticed. At 14LT314, and A802, 14LT316, no such evidence was found and the initial excavations were therefore ended at relatively shallow depths. At 14LT315, soil probing suggested that further excavation would be warranted, hence more excavation units were opened up and several were taken down as deep as a meter below surface.

At A801, 14LT316, the methodological situation was more clearcut, since the presence, nature, location, and general lateral limits of the midden area had been established in earlier investigations. The 1980 investigation therefore involved the excavation of as much as possible of the remaining northerly portion of the midden, in an attempt to obtain "...a more comprehensive artifact assemblage and prehistoric environmental data....," as recommended by Rowlison (1977:111). Once the northern limits of the southerly located 1973 excavations (A732) had been relocated with the use of the original field notes and maps, the ensuing excavations simply proceeded to the north following the limits of the midden.

The water flotation process first developed and described by Streuver (1962, 1968) was used to a variable degree in an attempt to locate floral and faunal remains and similarly small sized artifacts which might otherwise have escaped detection. Using this technique, samples of soil with an assumed high potential for containing such remains were collected and bagged in the field and removed to the laboratory for processing. Soil samples were taken mainly from features, particularly from concentrations of charcoal, burned earth, and burned rock thought to represent hearth debris. None were taken at 14LT314 or A802, 14LT316 due to the lack of such features and the highly disturbed nature of those site areas. A few samples were taken from the features at 14LT315, and many were taken, some at random, from the A801, 14LT316 midden area. Whenever possible, soil samples were "chunked" out, rather than thoroughly troweled, in an attempt to minimize destruction of the remains. All light-fraction and heavy-fraction units were subsequently examined in the laboratory with the use of a microscope. Recovered floral remains were then examined and identified by Dr. Ronald L. McGregor, the Kansas State Biologist.

Following the completion of the fieldwork, analysis of the recovered archeological materials was carried out. For the purposes of the report, the results of the analysis were divided into four major categories: ceramic artifacts, including burned earth and daub as well as pottery sherds; lithic artifacts, both chipped and ground; faunal remains, including mollusc shell as well as animal bone; and floral remains, consisting of charcoal, seeds, and nut shell fragments.

One technical term used in the report and which might require explanation to some readers is the term "krotovina." This is a word primarily used by soil scientists to describe "...irregular tubular streaks within one [soil] horizon of material transported from another horizon, ... caused by the filling of tunnels made by burrowing animals in one horizon with material from another horizon" (Soil Survey Staff, U.S. Department of Agriculture 1951:244). Rodents and crayfish are usually the animals responsible. In a two-dimensional soil profile, krotovinas appear as rounded or elliptical spots of various sizes and usually contain fill of a different color or texture than the surrounding soil matrix. Three dimensionally, krotovinas usually have an irregular tubular shape and often "hook off" abruptly in one or more directions. The term krotovina, slightly expanded in meaning, has archeological utility in that one can use it to describe such anomalous soil features without necessarily imputing a definite cause or origin to them. Any linear, tubular-shaped area of disturbed or intrusive soil for which several causes are possible can thus be documented and discussed without attributing an exact cause to the phenomenon.

Pottery analyses within the report have been formulated in terms of Wheeler's (1952) checklist of features and descriptive terms. Tempering of an atypical or even mildly remarkable nature was investigated by means of microscopic examination. Cord impressions produced by cord-roughening were investigated by means of positive clay impressions. The cords used in producing the impressions--not, it should be emphasized, the cord impressions themselves--are described as either "S-twist" or "Z-twist," using Rohn's terminology (1971:114). Cord size, or diameter, is described somewhat arbitrarily as being fine, medium, or large gauge, with medium gauge cord defined as being from 2.0-3.5 mm in diameter.

The lithic analyses are concerned with the morphological characteristics of the artifacts and the types of stone of which they are made. For the projectile points, morphological/typological affinities with established point types are described even though exact correspondences are not always apparent. Sources employed in the latter include the Guide to the identification of certain American Indian projectile points, by Bell (1958, 1960) and Perino (1968, 1971), the Handbook of Texas archeology: Type descriptions, by Suhm and Jelks (1962), and The lithic industries of the Illinois valley in the Early and Middle Woodland period, by Montet-White (1968).

The chipped stone assemblages consisted of various kinds of chert, but only six kinds were of a typologically identifiable nature. Few of the cherts in the area have ever undergone a thorough geological investigation, hence it has been necessary in some cases to employ colloquial and/or visually descriptive terms in describing some of the recognizable types. Cherts of a fairly well known nature which have been investigated and documented to some degree include those referred to as Florence, Foraker, Peoria, and "river rolled chert" (Cenozoic gravels). Other identifiable chert types, of a localized and geologically undocumented nature, include "field chert" and a black chert. All other cherts were relegated to an "other" chert category for the purposes of this report.

Florence chert, or "flint," as it is commonly called, is derived from Permian limestone formations which outcrop in the Flint Hills some 60-80 miles to the west of the Big Hill area. The presence of Florence chert at Big Hill archeological sites thus provides direct evidence for long distance transport of the material by means of trade relationships or direct procurement. The Florence is a high quality, medium textured, easily worked material which lends itself well to chipped stone industry. Judging from its common occurrence at prehistoric archeological sites, some of which are at some distance from the Flint Hills, the stone was apparently in high demand. There are considered to be two varieties of Florence, a southern and a northern, although there is some evidence that the two varieties represent stratigraphic variations rather than a differing geographic distribution (Haury 1981:46). The southern variety, sometimes referred to as "Kay County Flint" (Cooper 1975), is tan or brownish colored, contains a variety of fossils, especially fusulinids and gastropods, and is often banded. The northern variety is dark gray or bluish gray colored and often contains silicified echinoid spines and other fossil fragments which create a speckled or mottled

effect. Most of the chert identified as Florence within the present report was banded.

Foraker chert is a "...very distinctive..." (Haury 1981:47), coarse textured, homogeneously gray colored chert whose most distinctive characteristic is a preponderance of unsilicified and relatively large foraminifera some 2-5 mm in length. Bedrock exposures of Foraker are known from Permian beds in the southern Flint Hills in Cowley county, Kansas and Osage and Pawnee counties, Oklahoma, but a similar material also apparently occurs in scattered locations throughout the Cuestas.

Peoria chert has also undergone some investigation, but less is apparently known about it than the Florence and Foraker. According to Skinner (1957:39), Peoria is a "...massive, thick, whitish chert of Mississippian age." Baldwin (1969:81) reports it to have a grainy texture, and notes that an extensive quarry is located in northeastern Ottawa county in the extreme northeastern corner of Oklahoma, some 60 miles to the southeast of Big Hill lake. Peoria chert is probably derived from the Keokuk or Burlington limestone formations of the Lower Mississippian series. The Keokuk formations, the only outcropping Mississippian rocks in Kansas, are confined to a small area in Cherokee county in the extreme southeastern corner of the state. According to Goebel (1968:19), the Keokuk beds contain a stratigraphically variable, white tripolitic chert, with the chert content of the formation generally being greater than 50 percent by volume and weight. Limestone and dolomite beds overlying the Keokuk towards the north and very likely comprising part of the closely related Burlington formation contain an opaque white chert, but outcrops of the material are probably confined to valley cuts. Either of these cherts could be what is now known generally as Peoria.

"River rolled chert" is a colloquial term used to refer to chert cobbles and gravels distinguished by the presence of a thin, dense, rind-like, caramel or reddish colored cortex resulting from extensive weathering and/or alluvial action. The cobbles and gravels are almost always smooth surfaced and well rounded. River rolled chert occurs throughout east central and southeastern Kansas in scattered locations throughout the valleys and as a discontinuous surface veneer in the uplands. According to Bayne and O'Connor (1968:58), the predominantly stream-laid gravels are found in the uplands in clay deposits up to 20 ft thick on terraces at elevations of 100-200 ft higher than the present major streams. River rolled chert is thought to

represent a Cenozoic "lag deposit" derived from the weathering and subsequent eroding away of Permian limestone formations during the Pliocene and Pleistocene periods (Honderich 1970). However, at least some of the material is probably from Pennsylvanian formations which underlaid the Permian.

"Field chert" is another colloquial term, first used by Rowlison (1977) to describe the locally abundant chert found in almost ubiquitous distribution at archeological sites in Big Hill reservoir and all along the Big Hill drainage, where field chert has been scattered across the valley floor by alluvial action. Field chert is bluish gray or gray in color and occasionally quite fossiliferous; its occurrence is usually in the form of small angular chunks that are typically no larger than fist sized. Cortex commonly covers much of the exteriors of the chunks. The cortex is a hard, orangish tan colored, iron-rich limestone which is usually heavily pitted or riddled through, probably as the result of water erosion. Natural outcrops of field chert have yet to be located, but they are obviously to be found within one or more of the Pennsylvanian limestone formations in the uplands along the edge of the valley. The full areal extent of the material is unknown at present, but it is almost certainly confined to southeastern Kansas and perhaps just to the Big Hill area. Judging from the proportionately large amounts of field chert found at archeological sites in the Big Hill area, field chert was evidently a mainstay of local chipped stone industry, despite the fact that it is a fairly low quality chert due to its sometimes coarse texture and its tendency to fracture into angular chunks. In fact, most of the field chert found in archeological context consists of angular chunks that range from unmodified shatter to incipient cores from which one or two flakes were struck. This causes a very real problem for the lithic artifact analyst, since differentiation between unworked and slightly worked field chert is quite difficult and often subjective.

The last of the identifiable cherts to be discussed is a black chert, possibly an argillite, notable because of its atypical color and distinctive fracturing characteristics. It was not abundant, although a few waste flakes and in two cases a small number of tools of the material were found at all three of the sites investigated. Referred to as "black chert" for the sake of convenience, the material exhibits minute brownish tan specks within a homogeneous mass ranging in color from very dark gray to nearly jet black. It is medium textured and has a hard, orangish brown colored, iron-rich cortex. Several of the larger flakes and tools

exhibit a distinctive "twisted" shape, suggesting this to be a normal fracturing characteristic of the material. The origin of the material is not known, but it is probably of local occurrence in one of the Pennsylvanian limestone formations.

Heat treatment, or more properly, the thermal pretreatment of chert, is another attribute that has been noted whenever observed during the lithic analysis. The results and identifying characteristics of such treatment have been investigated and described in detail by several authorities (e.g., Collins and Fenwick 1974; Mandeville 1973; and Mandeville and Flenniken 1974). Heat treatment is known to enhance the workability of chert, causing it to become less brittle and more elastic, allowing much greater control of the flaking. Heat treatment can be determined with absolute certainty only by means of lithologic microscopic analysis, but the results of the treatment are usually visible, at least in part, to the naked eye. The two major macroscopic characteristics are the creation of a greasy luster and a change in the color of the chert, usually to a distinctive pinkish, reddish, or orangish coloration. Accordingly, all chert artifacts exhibiting these characteristics were recorded in the analysis as appearing to have been heat treated. Field chert, unfortunately, presented a problem in this regard, since it apparently does not respond dramatically to heat treatment and since it occasionally has a naturally pinkish hue due to high ferrous content.

The artifact categories employed in the lithic analyses are based on morphological and functional considerations common to archeological reports from throughout the Prairie/Plains, and are intended to facilitate higher-level comparative analyses. The ground stone categories--pendants and gorgets, mullers and grinding slabs--should cause no confusion for most readers. Chipped stone categories, however, often vary with the analyst, and will for that reason be described, as follows:

1. Projectile points. This category includes artifacts which are bifacially flaked, relatively thin in cross-section, and comparatively small, symmetrical, and pointed in shape. They are usually notched or stemmed for hafting, although plain triangular forms are also common. Projectile points were produced in fairly standardized forms, a fact which facilitates typological identification by the archeologist. The artifacts are assumed to have been used as tips for arrows, darts, and spears.

2. Preforms. This term is primarily used, following Montet-White (1968:31), to refer to projectile points in an obviously intermediate and semifinished state of manufacture. Preforms of this sort may range in completeness from crudely roughed-out quarry bifaces to carefully shaped and thinned projectile point blanks that have been completed except for forming the notches (Bell 1980:5). The term is often applied, and is within the present report, to any bifacially or unifacially flaked artifact or tool which has evidently not been completed or fully finished. Many preforms were apparently broken during the manufacturing process and subsequently discarded because of defects or flaws in the chert, and hence represent unsuccessful attempts to make specific artifacts.

3. Knives. This term is applied to bifacially flaked artifacts which are relatively large, elongated, symmetrically shaped, and pointed on one end, although ovate forms are also recognized. These artifacts are assumed to have been used for various cutting tasks, but some "knives" may actually be points for spears or lances. Alternately beveled forms are probably the most common, or at least the most easily recognized, type of knife encountered at prehistoric sites in the Prairie/Plains.

4. Drills. This term refers to bifacially flaked tools which have relatively slender, elongated, pointed "blades" or bits with bitriangular or lozenge-shaped transverse cross-sections formed by steep retouching. Drills are often expanding based, or T-shaped, but drills made from notched projectile points or point preforms are also common, as are drills with unworked and amorphously shaped bases. As the term implies, drills were apparently used to drill holes or concavities in stone, bone, or wood.

5. Choppers. Choppers are large, thick, tabular, usually ovate-shaped tools with crudely flaked, bifacial cutting edges. They are usually crudely made and rather heavy, and often appear to have been heavily battered. Choppers are thought to have been used for heavy cutting tasks, such as the butchering of large animals and the processing of woody plants.

6. Endscrapers. This term refers to tools which have a snubnosed shape formed by steep and essentially unifacial flaking. Endscrapers are sometimes circular but are more commonly oblong or triangular shaped with plano-convex longitudinal cross-sections. This distal (bit) ends are usually wide and thick while their proximal (butt) ends are comparatively narrow and thin. Endscrapers with prominent

medial ridges extending the length of the artifact (i.e., endscrapers with triangular transverse cross-sections) are referred to as being "keeled." Endscrapers are thought to have been used in the working of hides, primarily in the softening process.

7. Bifaces. This term is purely descriptive, forming a "catchall" category which includes all bifacially flaked chipped stone artifacts other than cores and recognizable tools. Some bifaces are probably tool preforms representing very early stages of production, others may have been quickly flaked and used briefly in an ad hoc manner, and still others may be nothing more than "test pieces" which were checked for workability and then discarded. Tip sections and unnotched midsections and basal sections probably from projectile points or knives are also included within the biface category.

8. Unifaces. This category is also descriptive rather than functional, encompassing all unifacially flaked artifacts other than endscrapers. Many unifaces are probably nothing more than test pieces, but the term is also applied to so-called "retouched flake scrapers" and sidescrapers. The former are generally small flakes which have been minimally retouched on one end, while the latter are often larger and have at least one long, regularly shaped, steeply retouched edge. Unifaces of this sort were likely used as adjuncts to endscrapers in the working of hides.

9. Utilized flakes. This term has been applied to all flakes which exhibit marginal modification resulting from utilization rather than intentional retouch. The flakes were presumably used in an ad hoc manner for various cutting and scraping tasks. For that reason, the utilization wear, consisting of steep, nonuniform "flaking" or breakage, can be either bifacial or unifacial.

10. Cores. This term refers to relatively thick and usually large and amorphously shaped stone cobbles or slabs which were used as a source for flakes which could then be utilized or made into various tool forms. Cores are characterized by their size and shape and by the presence of large percussive flake scars on their surfaces. The flake scars were occasionally placed so as to result in a sinuous bifacial edge, but they more commonly occur in a random, multidirectional fashion. Unfortunately, it was oftentimes difficult to apply the above definition during the lithic analyses, since much of the field chert from the three sites consisted of lightly worked chunks from which one or two flakes appeared to have been struck. In a technical sense,

these could be defined as cores, or test pieces, but it seemed more appropriate to list them simply as "chunks."

11. Debitage. This term refers to what is essentially industrial waste, specifically unused flakes and shatter produced as a by-product of the manufacturing and repair of chipped stone tools. Waste flakes have a more or less planar form, while shatter is characterized by a thick, irregular, "chunky" shape and a lack of sharp "leading" edges. Debitage was further differentiated according to decortication: primary decortication specimens have cortex covering all of their dorsal faces, secondary decortication specimens have cortex on only a portion of their dorsal faces, and blank decortication specimens have no cortex whatsoever. Thedebitage analysis was complicated by the same factor that affected the defining of cores. That is, much of the field chert from the three sites consisted of angular chunks that could be variously interpreted as shatter, unworked "chunks," or incipient cores. Size proved to be the only viable criterion for differentiation; thus, unworked pieces of field chert which are thumb sized or smaller were defined as shatter, and larger pieces as "chunks."

INVESTIGATIONS AT 14LT314

Archeological site 14LT314 occupies an oval area around two and a half acres or one hectare in size on the edge of a broad, relatively flat and featureless alluvial terrace on the right (west) bank of Big Hill creek (see Figure 3). A minor drainage marks the north edge of the site, and a small expanse of lower lying bottomland the east. Uplands to the east of 14LT314 are quite precipitous, while those to the west are less so. At an elevation of approximately 832 ft MSL, the site will be permanently covered by some 26 ft (8.5 m) of water when the Big Hill lake project is in full operation.

INVESTIGATIONS PRIOR TO 1980

Site 14LT314 was first recorded by Society archeologist Thomas A. Witty, Jr., in 1972. The site was under cultivation at the time of Witty's visit, and numerous chert flakes and sandstone fragments were observable on the surface of the field, although no culturally diagnostic artifacts were encountered. The site was tentatively identified as a Middle Ceramic habitation site on the basis of a number of small, thin, side notched projectile points recovered and reported by private collectors.

In 1976, the site was tested by a small crew under the direction of Society archeologist Don Rowilson. The initial testing consisted of soil probing with the use of an Oakfield soil sampling tool. No subsurface cultural evidence was discerned, however. Eleven excavation units of various sizes, none larger than 2 m², were then dug, all to a depth of at least 30 cm below surface. Artifactual material gained from the testing was quite minimal and consisted entirely of lithic specimens, virtually all of which were contained within the plow zone. One diagnostic artifact was found, an oppositely beveled knife fragment. Knives such as these are generally found in Middle and Late Ceramic context, hence the fragment can be regarded as corroborating the Middle Ceramic cultural affiliation inferred for the site previously by Witty.

While few artifacts were recovered, the testing did reveal the presence of one cultural feature in the extreme southern portion of the site, at a depth of 30 cm below surface. The feature, interpreted as a post mold, was 12 cm in diameter and gradually tapered to a length of 51 cm. No cultural debris other than small charcoal flecks was observed in the fill of this feature. Due to the presence of

the post mold, Rowlison recommended (1977:89) that additional testing investigations be executed in the southern portion of the site area, in the hope that such work would help identify the spatial extent of the cultural materials, determine the utilization of any activity areas, and possibly provide data that could be associated with nearby prehistoric site 14LT315.

THE 1980 INVESTIGATION

The 1980 investigation of 14LT314 began with a pedestrian inspection of the surface of the site. No archeological remains were found, probably largely due to dense vegetational cover. A locational grid was then established in the southern portion of the site and excavation was begun. The initial excavation efforts were centered around the 1976 test pit in which the post mold was found. When these efforts failed to result in the discovery of any other post molds, a few excavation units were begun to the north, along the crest of the terrace. By the end of the investigation, eight 2 m² excavation units had been dug. The majority were excavated to a depth of 45 cm below surface; one was taken to a depth of 55 cm.

In general, the excavations revealed a plow zone approximately 25 cm thick, comprised of a friable sandy clay loam, pale brown or light grayish brown in color. Below the plow zone, the soil had a very weak structure and a slightly orangish brown or yellowish brown coloration. Small pieces of sandstone were fairly common in both the plow zone and the subsoil. Small, scattered, amorphously shaped pockets of sandier, lighter colored soil were occasionally observed in the subsoil.

Cultural Features

No clearcut cultural features were discovered during the course of the 1980 investigation, but one excavation unit had several soil discolorations that should be mentioned in this context. These discolorations consisted of small, irregularly shaped areas of dark, humus-like soil containing small charcoal flecks along with occasional very small pieces of burned sandstone and very small flecks of what appeared to be burned earth. Several of the discolorations were linear and horizontally oriented, and several were contained within thin, grayish colored "rings." All of the discolorations were within the initial 10 cm of soil below the plow zone. None were associated with any cultural remains.

The discolorations were interpreted by the writer as being the decomposed remains of burned or charred wood, possibly even the remains of a hearth scattered by flooding. It would be highly speculative to ascribe a definite cultural origin to them due to their unpatterned arrangement and their lack of association with any cultural remains or hearth rock. It is quite possible, in fact, that they are the result of a natural occurrence wholly unconnected with the prehistoric occupation of the site.

Archeological Materials

Archeological materials recovered from 14LT314 in 1980 consisted of chipped stone artifacts, burned sandstone, charcoal, and burned earth. Both the burned earth and the charcoal were of minor abundance and small particle size. No particular concentrations of either were noted, and the majority of both was contained within the plow zone. The burned sandstone was likewise confined mainly to the plow zone and scattered throughout the site along with unworked, unburned pieces of sandstone of various sizes and shapes.

The chipped stone artifact inventory includes one projectile point, one biface fragment, two cores, and assorted debitage. All are made of chert. Approximately 85 percent of the material, including both of the two tools, was found within the plow zone, with the majority of the remainder coming from the initial 10 cm below the plow zone.

The single projectile point is a small, corner notched, expanding stemmed specimen made of field chert. The tip is missing and the artifact is rather thick and crudely flaked, suggesting that it may be a preform broken during manufacture. It does not appear to have been heat treated. The specimen is 4 mm thick and has a maximum blade width of 10 mm, stem width of 6.5 mm, and basal width of 9 mm. The base is straight. The point is presently 16.5 mm long but an original or intended length of around 26 mm can be estimated. Typologically, the artifact appears to be representative of the Scallorn projectile point type (Bell 1960:84).

The other bifacial tool from the site is a small, more or less triangular-shaped biface fragment. Broken on its broader end, the specimen may be the stem section of a contracting stemmed projectile point or knife. It is 24 mm long and is made of heat treated, pinkish white chert. The base is straight to slightly convex, and rather narrow, 9.5 mm wide. Basal retouch is confined to one face of the artifact. The broken end opposite the base is 17 mm wide and 8 mm thick. One of the two long edges of the biface is

crudely flaked, with broad percussive flake scars. The opposite edge has been more carefully worked and has been heavily ground as well.

Two cores were also found, one within the plow zone and one from the initial 10 cm below the plow zone. Both are small, irregularly shaped specimens made of field chert. Neither appear to have been heat treated.

A total of 141 pieces of debitage, including 114 waste flakes and 27 pieces of shatter, was recovered from the excavations at 14LT314. Approximately 85 percent of the debitage was contained within the plow zone, with the majority of the remainder coming from the initial 10 cm below the plow zone. The debitage includes 10 primary, 48 secondary, and 83 blank decortication specimens. Most of the debitage is field chert, but 12 specimens of somewhat fine textured black chert were recovered, along with three tan colored flakes derived from river rolled chert cobbles. Approximately 14 percent of the debitage appears to have been heat treated. No Florence, Foraker, or Peoria chert specimens were found at the site.

SUMMARY AND CONCLUSIONS

The 1980 investigation of 14LT314 involved the systematic excavation of eight 2 m² excavation units in the southern portion of the site. The excavations indicated that the primary archeological context of the site has been destroyed by cultivation. Structural remains, i.e., post molds, suspected to be present on the basis of the 1976 testing activities, were nowhere encountered during the 1980 investigation. The cultural remains which were found consisted of lithic artifacts, mostly chipped stone debitage, along with scattered sandstone hearth rock, burned earth fragments, and charcoal. Almost all the remains were contained within the plow zone.

While the information gained from the site as a result of the various investigations is rather minimal, several conclusions can be drawn from the available data. First, it is apparent that the site represents a Middle Ceramic occupation. This inference, originally based on a private collector's reports of finding small, side notched projectile points at the site, can be regarded as corroborated by the beveled knife fragment excavated in 1976 and the Scal-lorn-like projectile point recovered in 1980. It is likely that a Pomona focus occupation is represented, but the lack of ceramic evidence compels this conclusion to be tentative rather than certain. Second, it is inferred that the site

represents a short-term occupation. This conclusion is prompted by the absence of pottery and structural remains at the site, along with the undiversified and rather minimal nature of the artifact assemblage. And finally, it can be inferred from the few functionally diagnostic artifacts, the projectile points and the beveled knife, that hunting was at least one of the major concerns of the site's inhabitants.

INVESTIGATIONS AT 14LT315

Archeological site 14LT315 occupies an oval area around two acres or little less than a hectare in size on the crest and upper slopes of a southeasterly pointing alluvial terrace ridge on the right (west) bank of Big Hill creek (Figure 3). The creek passes by the east edge of the site and then loops back around a lower lying bottomland area to pass by again on the southwest. An east-west trending swale, a shallow drainage, marks the northern boundary of the site. The crest of the terrace, where most of the archeological remains were concentrated, is located in a formerly cultivated field just north of a forested area. At an elevation of approximately 832 ft MSL, the site will be permanently covered by some 26 ft (8.5 m) of water when the Big Hill lake project is in full operation.

INVESTIGATIONS PRIOR TO 1980

Site 14LT315 was first recorded by Society archeologist Thomas A. Witty, Jr., in 1972. The site was under cultivation at the time of Witty's visit. Chert flakes and several sandstone fragments were observed on the surface of the field, but no cultural affiliation could be assigned to the site since no diagnostic artifacts were found.

In 1976, the site was tested by a small crew under the direction of Society archeologist Don D. Rowlison. The initial testing consisted of soil probing with the use of an Oakfield soil sampling tool. The probing revealed that the soil contained "relatively large amounts" of cultural mix, primarily concentrated near the crest of the landform (Rowlison 1977:89). Eight randomly located excavation units were then dug, most of which were one or two meters square in size. The units were excavated to depths ranging from 30-60 cm below surface.

The 1976 excavations revealed that cultural mix, at least in one of the excavation units, extended to a depth of 50 cm below the ground surface. The testing produced a variety of prehistoric cultural remains, including some 130 pottery sherds. The pottery was cord-roughened and indurated clay tempered. These characteristics prompted Rowlison to interpret the pottery as indicating "...the possibility of a variant which presently has similarities to the Pomona wares..." (1977:98), and on this basis he tentatively identified the site as having a Middle Ceramic cultural affiliation (1977:137). The lithic inventory, by contrast, was fairly limited and relatively nondiagnostic. Faunal remains were also recovered, but the inventory was limited to a few

specimens. The identifiable remains were reported as including a long bone fragment from a bison, burned pieces of turtle carapace, and a bone fragment which resembled that of a deer (Rowlison 1977:98).

Rowlison found two cultural features, a burned sandstone concentration and a putative post mold. The burned sandstone concentration consisted of five large tabular slabs distributed in an area about 93 by 68 cm in size, 30 cm below surface. Artifacts found in association include two cord-roughened pottery sherds and two pieces of burned earth. According to Rowlison, the feature "...could not be affiliated with any burning or firing activities..." (1977:90). One therefore assumes that it was not an in situ hearth.

The investigation also resulted in the discovery of a cultural feature interpreted by Rowlison to be a post mold. The feature, comprised of fill containing charcoal flecks and small particles of burned earth, extended from the base of the plow zone to a depth of 76 cm below surface, gradually tapering towards the bottom. The orifice of the post mold was oval, approximately 14 cm long and 11 cm wide. The feature was unaccompanied by any cultural debris, but its occurrence, along with the relatively large number of pottery sherds, was interpreted to indicate the possibility that the site "...once supported some form of superstructure which may be associated with a dwelling of some duration" (Rowlison 1977:98).

Rowlison noted further that the forested area along the south edge of the site had been designated for timber clearance and that that area would therefore be subjected to heavy construction impact as well as later inundation. Since the site not only had apparent structural remains but in addition constituted the only known intact Middle Ceramic site in the reservoir vicinity, he assigned it a top priority for future and more extensive archeological investigations (Rowlison 1977:137). "Future study..." it was felt, "...would provide additional data pertaining to the theoretical reconstruction of this prehistoric cultural entity and provide more information relating to the settlement patterns and the peoples' utilization of the environment in the Big Hill vicinity" (Rowlison 1977:137).

THE 1980 INVESTIGATION

The 1980 investigation of 14LT315 began with a pedestrian inspection of the area. No archeological remains were found, in part due to dense vegetational cover. A

locational grid was then established and excavation begun. By the end of the investigation, sixteen 2 m² excavation units had been dug (see Figure 5). The majority of the units were taken to depths ranging from 50-80 cm below surface. One unit, X24, was dug to a depth of 1.0 m below surface and another, X35, to a depth of 1.1 m. The initial excavation efforts, in X2, X4, and X9, were centered around the 1976 test pit in which a post mold was reportedly found. When these efforts failed to result in the discovery of post molds or any other habitational evidence, the focus of the investigation shifted to the northwest, along the crest of the terrace. Following the completion of those 16 excavation units, six 45 cm² test pits were excavated in the forested area to the south, in an effort to check the spatial extent of the site. Each of the test pits was dug to a depth of 45 cm below surface.

No cultural materials whatsoever were found in the six test pits, nor was there any evidence of a plow zone. A faint, light gray colored A₂ soil horizon indicative of soil formation under forest vegetation was observed in one pit, but otherwise the soil strata in the pits consisted of friable, dark brown colored soil which gradated into a weak structured, tan colored subsoil. In the larger excavation units, cultural remains extended to depths of up to 60-70 cm below surface, although the majority of the artifactual material was found in the plow zone and the initial 15-25 cm below it. The plow zone was approximately 25 cm thick and was composed of a friable sandy clay loam, pale brown or light grayish brown in color. Below the plow zone, the soil had a very weak structure and a slightly orangish brown or yellowish brown coloration. The intensity of both the structure and the color of the soil increased with depth. Small pieces of unburned sandstone, hematite, and limonite were fairly common in both the plow zone and the subsoil, although their abundance decreased with depth.

Cultural Features

Two cultural features were found during the 1980 investigation of 14LT315. One was a burned rock concentration, Feature 28, and the other was a post mold, Feature 30. Feature 28 was located in the south part of X6 and along the north edge of X28 at a depth of 32-45 cm below surface. The feature consisted of a mass of burned limestone and sandstone accompanied by 14 pottery sherds, six pieces of chipped stone debitage, several pieces of burned earth, and charcoal flecking. The limestone and sandstone rocks were typically palm sized or slightly larger. The pottery sherds found amongst the rocks, including one rim

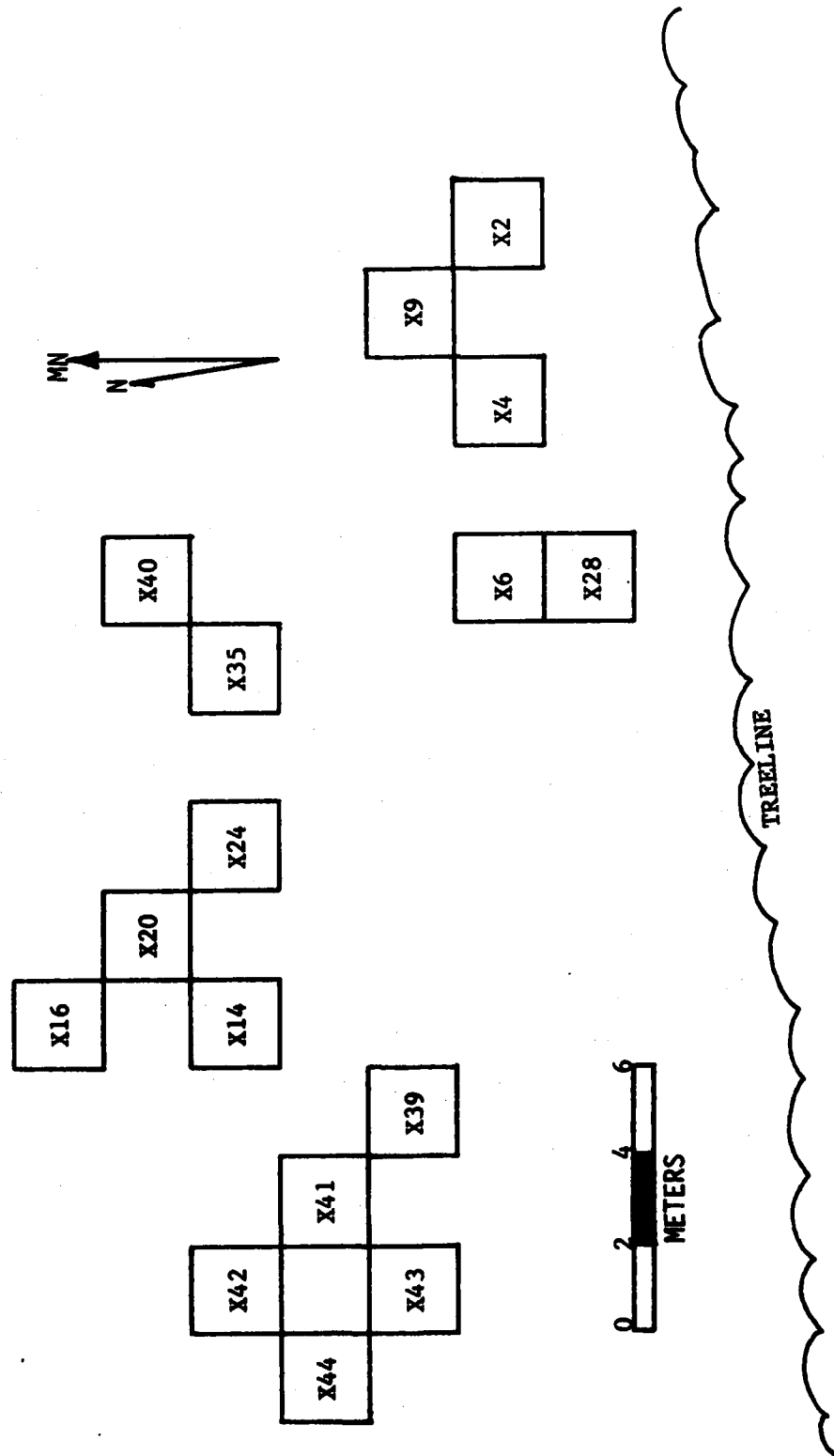


FIGURE 5. Map showing the location of excavation units dug in 1980 at 14LT315.

sherd, had cord-roughened exteriors and indurated clay tempering. The pottery is essentially identical with the pottery previously excavated at the site by Rowlison (1977:94-97) and is typologically identifiable as Pomona ware (c.f. Wilmeth 1970:29-33). Charcoal flecking was scattered throughout the feature. Burned earth fragments displayed a similarly scattered distribution, rather than being found primarily along the periphery of the feature as one would expect in a hearth of any duration. Both the burned earth and the charcoal were of minor abundance and small particle size. In sum, the feature was not clearly indicative of an in situ hearth and it is quite possible that it represents a trash deposit of hearth rock and associated household debris, since a number of sherds, a biface, and around a hundred pieces of debitage were found in fairly close association, surrounding the feature. No evidence of a pit was found, however.

The feature interpreted as a post mold, Feature 30, was located in the south central portion of X41. The orifice of the feature, encountered at a depth of approximately 32 cm below surface, was roughly circular with a diameter of approximately 29 cm. The diameter of the feature expanded to approximately 35 cm at a depth of 36 cm below surface before tapering to a narrow, cylindrical end at 95 cm below surface, for a total length of approximately 63 cm. The feature fill consisted of dark, friable soil containing abundant charcoal and burned earth flecking contained within a 2-5 cm thick "ring" of partially fired, orange and gray colored burned earth. Two chert waste flakes were also present within the feature fill. Noncultural evidence was also present: the feature was intersected in several spots by krotovina, apparent filled rodent runs, which entered it from the side at various angles.

Despite the interpretation of the feature as a post mold, no corroborating structural evidence was found at the site to suggest the former presence of a house. Since the orifice of the post mold was at 32 cm below surface, one would suspect the remains of a house floor to be present at or just above this level, i.e., within the initial 10-15 cm below the plow zone. Excavations in and around the post mold, however, and for that matter throughout the entire site, failed to reveal any clearcut evidence of a house floor. Grass impressed daub, one of the most distinctive characteristics of Pomona focus houses, was conspicuously absent at the site. Moreover, the post mold in X41 was some 20 m (around 60 ft) from the post mold found by Rowlison in 1976, a distance quite out of keeping even with the large, 40-ft-long Cuesta houses known from other sites in

southeastern Kansas. The two 14LT315 post molds should therefore be regarded as isolated post molds of unknown function rather than as definite structural evidence.

Archeological Materials

The archeological materials encountered at 14LT315 in 1980 consisted of historic and prehistoric artifacts along with faunal remains, hematite and limonite fragments, charcoal, and burned limestone and sandstone. All prehistoric artifacts and all faunal remains, hematite, and limonite encountered in the investigation were collected, along with the larger pieces of burned earth and a few charcoal samples. Historic material, consisting of one rusty square nail and three small coal fragments, was recovered from the plow zone. Since it is of no relative importance, it will not be discussed further.

Ceramic Artifacts

The ceramic artifact inventory resulting from the 1980 investigation consists of 316 pottery sherds and a few pieces of burned earth. The pottery includes 17 rim sherds, nine neck sherds, and 290 body sherds, representing a minimum of 10 separate vessels. Half of the pottery was recovered from the plow zone of the various excavation units, another 15 percent from 20-30 cm below surface, another 28 percent from 30-40 cm below surface, and the remaining 7.0 percent from 40-50 cm below surface. Most of the sherds from the latter two levels were in or closely adjacent to the burned rock complex, Feature 28, in X6 and X28.

Indurated clay temper inclusions are observable in the paste of almost all the sherds recovered in the 1980 excavations. The particles range in size from very small to large (ca. 6-7 mm in diameter), and range from light gray to dark orange in color. Manganese particles were also commonly observed. Hematite flecking is present as well, occasionally in marked abundance, in 32 percent of the sherds. All three of these tempering elements may be naturally occurring constituents of the clay, but the presence of a number of hematite fragments at the site suggests the possibility that crushed or powdered hematite may have been intentionally added to the paste. Likewise, the indurated clay may have occurred naturally within the clay, but the orange coloration of much of the temper suggests that crushed sherds or burned earth may have been used as well.

Surface textures of the sherds are commonly fine, although a few sherds are slightly sandy and thus exhibit a medium fine surface texture. Core textures of the pottery are laminated or, more commonly, contorted. Approximately 10 percent of the total have a compact core texture.

Surface colors of the sherds range from light tan and orange to dark brown or black, with various shades of brown and orange predominating. Several of the sherds have black interiors. Core colors range from light tan to black, with browns and grays being most common. The few sherds with black interiors also have black cores.

The exterior surface treatment of the pottery consists almost entirely of cord-roughening. One notable exception was found, a small, somewhat sandy textured rim sherd with a plain exterior and interior surface. The cord-roughening on the rest of the inventory consists primarily of parallel cord impressions, with criss-cross cord-roughening being present on a third of the inventory. The simple two-ply cordage used in producing the cord impressions ranged in size from fine to medium gauge, or up to ca. 2.25 mm in diameter. Examples of both S-twist and Z-twist cordage are identifiable, with the S-twist sherds outnumbering the Z-twist by a ratio of approximately five to one.

The interior surfaces of the sherds exhibit two kinds of surface treatment, smoothing and wiping. Wiping striations were noted on 30 percent of the inventory, but this statistic is somewhat misleading since the bulk of the plain surfaced sherds are small sized specimens which could easily have come from vessels with largely wiped interiors. Wiped surfaces are present on over half the rim and neck sherds and most of the larger body sherds. In those cases where it could be ascertained (i.e., rim and neck sherds), the striations were oriented in a horizontal direction.

The interiors of almost all the sherds exhibited lumpiness, or an inconsistency in thickness, to one degree or another. As was the case with the wiping striations, this characteristic was not always noticeable on small sherds but was commonly apparent on larger sherds. Lumpiness was not usually present on the exterior surfaces of the pottery, however. It is assumed that this situation is the result of the potter using his or her hand as an anvil during the cord-roughening of the exterior of the vessel.

In terms of vessel morphology, the pottery remains appear to represent small to medium sized jar-type vessels. Several of the larger body sherds in the inventory suggest

that the vessels were largely globular in shape. Body sherds from the site range from 3.5-13.0 mm in thickness, with an average of 6.3 mm. Judging from the neck sherds and the rim sherds with necks, the vessels were somewhat thicker at the rim/shoulder juncture, with a range of 4.5-13.0 mm and an average of 8.0 mm. Midheight thicknesses of the rim sherds range from 6.0-8.5 mm and average 6.9 mm. Lip thicknesses range from 4-6 mm with an average of 4.5 mm. The lips are variably shaped, generally rounded or very slightly flattened. The lip on one rim sherd has been slightly flattened and thickened by the application of cord impressions. Judging from the rim profiles (see Figure 6) and the neck sherds, the pottery represents the remains of jar-type vessels with rims of medium height overlying fairly well defined but unconstricted necks and prominent, smoothly curved shoulders. One rim (Figure 6, I, and Figure 7, A) is outcurved; the others are straight and apparently vertical.

Decoration of the pottery consists of the cord impressions found on the lip of one rim sherd, and a shallow, smoothed concavity or depression which is present on the lip of another rim sherd (Figure 7, B). The concavity, apparently produced by pressing a finger downward on the lip of the vessel, is essentially identical to the single such example found at the site in 1976 and reported by Rowilson (1977:97). On the other decorated rim sherd (Figure 6, C, and Figure 7, C) two cord impressions are present on the extant portion of the vessel's lip. The impressions are spaced 4 mm apart and are positioned diagonal to the path of the rim. They were produced with the use of Z-twist cord approximately 1.5 mm in diameter, apparently the same cord as was used in marking the exterior surface of the vessel. The application of the cord was carried out with enough force that the lip was slightly flattened and pushed inward. Criss-cross cord-roughening is present on the upper exterior surface of the rim, extending downward from the lip some 20 mm. Cord-roughening may have been intended as decoration on one other 14LT315 rim sherd (Figure 7, D, and Figure 6, H) which has vertically oriented parallel cord-roughening on the rim and diagonally oriented parallel cord-roughening on the shoulder.

In general, the characteristics of the sherds recovered in 1980 are essentially identical with those of the sherds recovered in 1976. Rowilson's analysis of the earlier (and smaller) collection prompted him to infer "...the possibility of a variant which presently has similarities to the Pomona wares " (1977:98). In the present writer's view, the pottery from the site can indeed be regarded typologically as Pomona ware (c.f. Wilmeth 1970:29-33).

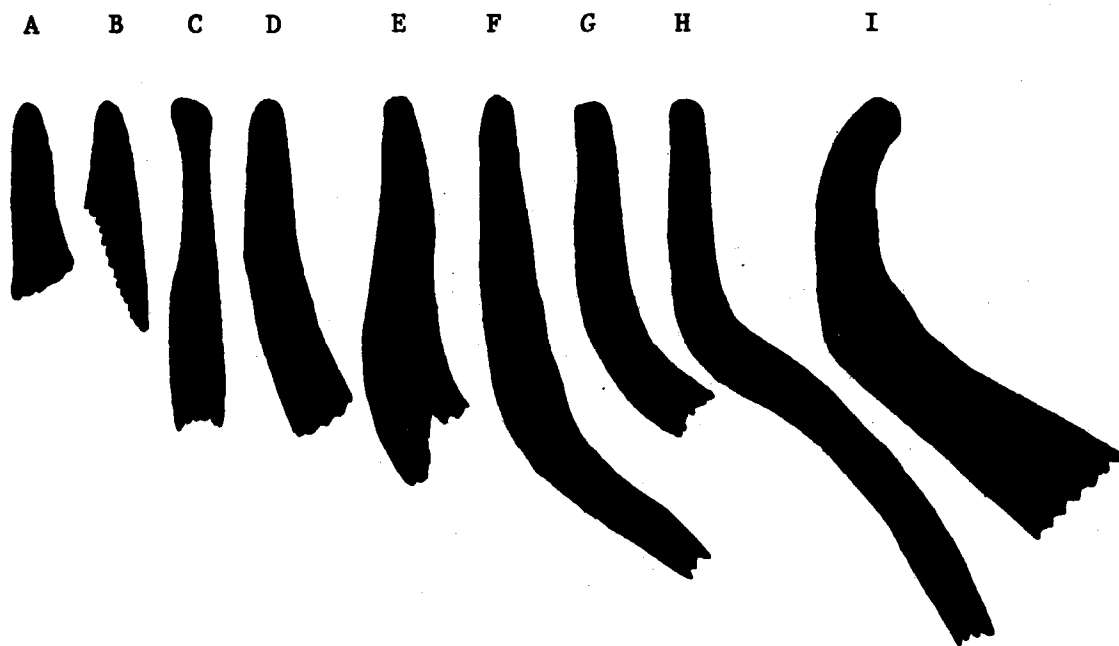
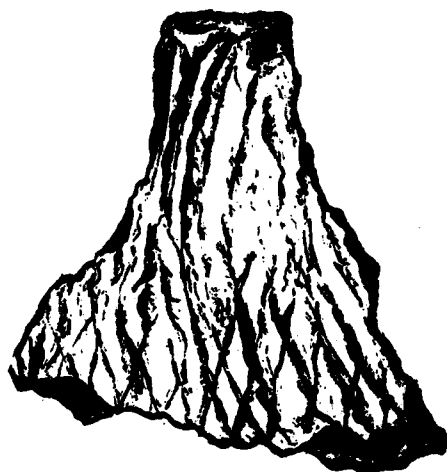


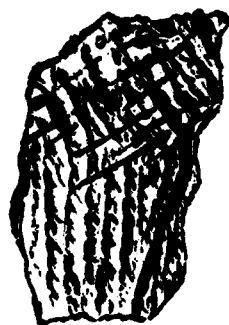
FIGURE 6. Miscellaneous rim profiles, 14LT315. Interior surfaces are on the left. Scale is full size.



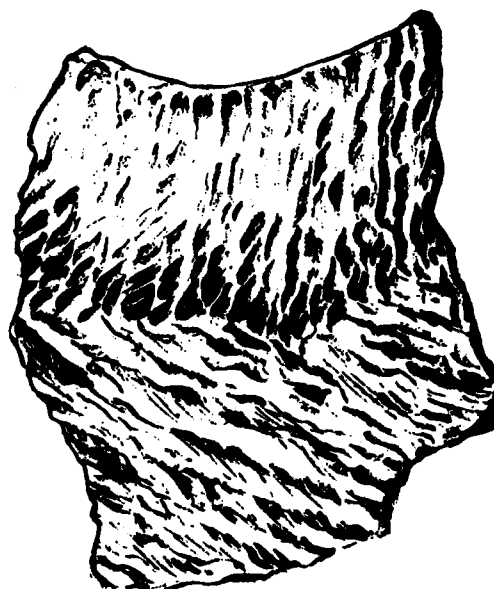
A



B



C



D

FIGURE 7. Selected rim sherds from 14LT315. Scale is full size.

Other ceramic remains recovered in the 1980 investigation of the site include six small pieces of burned earth. All are irregularly shaped and have a somewhat sandy texture. One piece has a few apparent grass impressions on a portion of one face, but in general, the inventory appears to be simply burned earth and not daub, the remains of a former structure.

Lithic Artifacts

The lithic artifact inventory resulting from the 1980 investigation includes an abundance of chipped stone tools and debitage and a few ground stone tools. The chipped stone consists of 20 projectile points, three point preforms, one drill or perforator, 24 bifaces, at least 10 of which are probably projectile point fragments, two endscrapers, 12 unifaces, three of which may be endscraper fragments, eight utilized flakes, five cores, and 2,141 pieces of debitage along with some 300 unworked or lightly worked chunks of field chert. The ground stone inventory includes portions of a sandstone muller and a grinding slab. Hematite and limonite fragments were also found and although none are worked, they have been included within the ground stone analysis for the purposes of this report.

Projectile points: Twenty projectile points were recovered from 14LT315 in 1980. The points differ mainly according to size, 16 being small and four being medium to large in size and/or thickness. Typologically, at least seven different projectile point types are represented. A degree of correlation is discernible between the size and typological affinities of the points and their respective proveniences. The small points with assumedly Middle or Late Ceramic typological affinities were recovered almost entirely from the plow zone or surface. Almost all of the larger points, which could possibly be of greater age, were found below the plow zone, sometimes at relatively great depths. In general, however, none of the larger points are wholly out of accord with most Pomona point assemblages, which commonly include a minority of large points.

The 16 small points are identifiable as representatives of the Fresno, Harrell, Huffaker, and Scallorn point types (c.f. Bell 1960:44, 1958:30, 1960:58, and 1960:84, respectively). Two of the Fresno and three of the Harrell points are made of field chert; none appear to have been heat treated. Four of the other points are made of different kinds of heat treated Florence chert, and one of the Huffaker and one of the Scallorn points are identifiable as being derived from a single source, a distinctively red and

tan banded, heat treated chert, probably a river rolled cobble. The other three of the 16 points include two of tan colored chert, one of purplish gray chert, and one of grayish white chert. In terms of provenience, all but three of the 16 small points came from the plow zone in the 0-20 cm below surface levels of the excavations. One of the three exceptions, a Fresno, came from the 20-30 cm level of X44 and may have been in the plow zone. Another, a side notched specimen of uncertain typological affiliation, probably a Harrell, Huffaker, or Reed (c.f. Bell 1958:76), was found in X6 at a depth of 28 cm below surface. The other exception, a Scallorn, came from the 30-40 cm level of X24. In terms of horizontal distribution, all but two of the small points were recovered from excavation units located on or immediately southwest of the crest of the terrace, primarily units X39, X41, X43, and X44. The two exceptions were both recovered from X6.

The three Fresno points (Figure 8, A-C) are all somewhat elongated in form, and one (Figure 8, A) is heavily serrated. Another, Figure 8, B, apparently had a portion of its base broken off and was subsequently reworked. All three specimens are 3 mm thick. Basal widths are 12 mm on the two points with complete bases. The point with a reworked base has a present maximum width of 13 mm and an estimated original basal width of 14 mm. Portions of the distal (tip) end of all three points have been broken off, but the extant portions of the artifacts indicate original lengths of 26 mm, 28 mm, and 31 mm, respectively.

Five Harrell points (Figure 8, D-H) were recovered. One (Figure 8, D) is heavily serrated and another (Figure 8, E) is slightly serrated. None of the five are whole, portions of their distal ends and/or their bases having been broken off. The points range from 2-4 mm in thickness with an average of 2.75 mm. Stem widths range from 6-8 mm and average 7.2 mm. Basal widths, measured on two and estimated on three of the five specimens, range from 11-13 mm and average 12.1 mm. Lengths, estimated in all five cases, range from 20.0-24.5 mm and average 22.3 mm.

One Huffaker point (Figure 8, I) was found during the 1980 investigation. It is a small, squat, slightly asymmetrical specimen with an unnotched and slightly concave base. A small portion of the lateral edge of its base has been broken off. The artifact is 2.5 mm thick and 14 mm long, and has a stem width of 7 mm. The basal width is estimated to have been 10.5 mm.

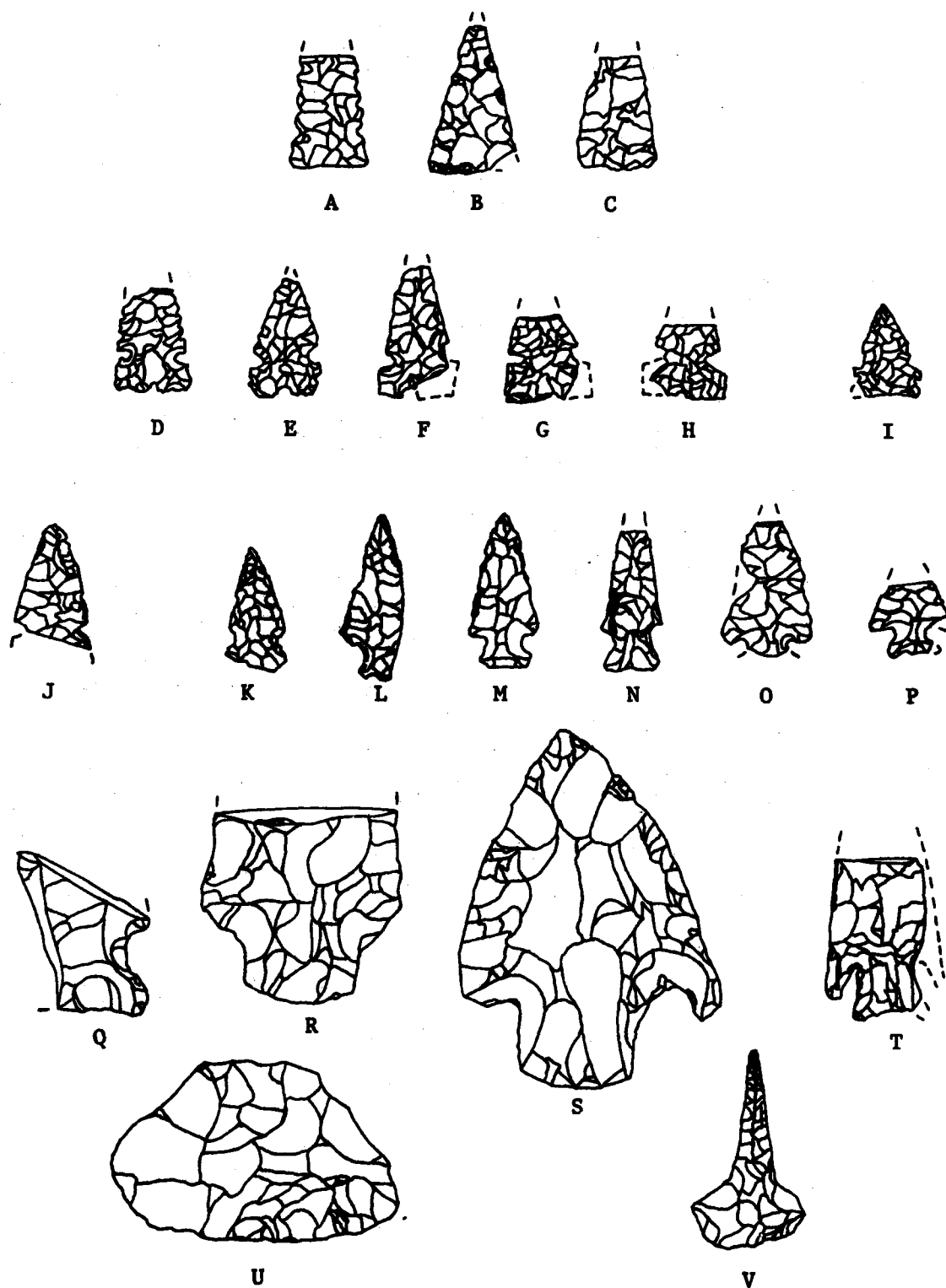


FIGURE 8. Selected lithic artifacts from 14LT315. Scale is full size.

One of the projectile points, Figure 8, J, has had its base broken off at and just below the side notches, thus making an exact typological identification impossible. However, the general characteristics of the point suggest that it belongs to the Harrell, Huffaker, or Reed point type. Recovered from X6 at a depth of 28 cm below surface, the artifact is small, thin, triangular, and side notched. It is 3 mm thick, and has a stem width of 8 mm. Due to the absence of the base, it was not possible to estimate the artifact's original length or its maximum (basal) width. However, the blade of the point is 17 mm long and has a maximum width of 11 mm.

Six Scallorn points (Figure 8, K-P) were retrieved from the excavation units. Three of the group are whole specimens; the other three have had portions of their distal ends and/or bases broken off. Of the three complete points, two appear to have been reworked. One, Figure 8, K, apparently had a part of the basal portion of its stem broken off and was subsequently reworked along that edge. The other, Figure 8, L, has had most of one lateral edge reworked, presumably after portions of the stem and blade had been broken off. Taken as a group, the six points range from 3-4 mm in thickness with an average of 3.3 mm. Stem widths of the six average 5.6 mm, with a range of 5-7 mm. The lengths of the four most complete points, estimated in one case, range from 19-27 mm and average 24 mm. Blade (maximum) widths of all but the point with the reworked lateral edge average 11.1 mm with a range of 9-14 mm. The reworked point is 9.5 mm wide.

In addition to the small points, four medium to large sized projectile points were found at 14LT315 in 1980. The four are morphologically dissimilar and can be assigned to four different typological categories. One, Figure 8, Q, is represented by a fragment consisting of a portion of the stem and barb sections of a corner notched, expanding stemmed point with a subconcave base. Unlike the other three large points, this specimen was recovered from the plow zone, in X40. The artifact is made of bluish gray chert, and is 7 mm thick. It appears to be a representative of the Edgewood point type (c.f. Bell 1958:20), but this inference is quite tentative due to the incomplete nature of the artifact.

Another of the large points, Figure 8, R, recovered from 34 cm below surface in X35, is a medium sized stemmed point made of heat treated, red and tan colored, banded chert, probably the same chert as that used for two of the small points. The base and most of the distal end of the

artifact are missing. Morphologically, it is uncertain whether the stem was contracting or parallel sided. The artifact is somewhat crudely flaked and may simply be a preform broken during manufacture. It is 9.5 mm thick, and has a maximum width of 31.5 mm and a stem width of 17.5 mm. Typological assignment is quite tentative due to the lack of a base, but affinities with the Gary, Langtry, or Lange point types (c.f. Bell 1958:28, 38, and 36, respectively) are apparent.

The third of the four large points to be discussed (Figure 8, S) was found at a depth of 52 cm below surface in X24. It is a fairly large stemmed point, made of grayish white chert. The artifact, from which one barb has been broken away, has a broad, relatively squat blade with prominent barbs, and a parallel sided stem with a subconvex base. The base has been heavily ground. The artifact is 9 mm thick and 56 mm long and has a stem width of 18 mm. Its maximum width, estimated due to the absence of one barb, was approximately 42 mm. Typologically, the specimen appears to be a representative of the Marshall point type (c.f. Bell 1958:44).

The last of the four points (Figure 8, T) was recovered from 70-80 cm below surface in X35. It is a fairly thin, medium sized specimen, made of heat treated, orangish colored Florence chert. The distal end of the artifact has been broken off, along with one of the tangs of the stem and one entire lateral edge of the blade, including the barb. Morphologically, the point has a narrow expanding stem with a subconcave base, and a blade with prominent barbs produced by deep, narrow, steeply angled corner notches. The blade appears to have been elongatedly triangular in shape, with straight to slightly convex sides. The artifact is 5 mm thick and has a stem width of 8 mm. Other, estimated, measurements include a projected length of 52 mm, a maximum (blade) width of 19.5 mm, and a basal width of 11 mm. The morphological characteristics of this artifact do not correspond exactly to any of the defined projectile point types, although there is some resemblance to the Marshall barbed points described by Montet-White (1968:79 and Figures 31 and 32). For this reason, no typological ascription has been made for the artifact.

Projectile point preforms: Three bifaces appear to be preforms for small projectile points. All are ovately triangular in form, rather thick for their size, and crudely flaked. Two are made of field chert and one of heat treated, pinkish white chert. Two of the group were recovered

from the plow zone; the other was taken from the 20-30 cm level of X16 and may have been in the plow zone.

Drill or perforator: One bifacially chipped artifact (Figure 8, V), recovered from the plow zone, has been classified as being either a drill or a perforator, and may indeed be a composite tool used for both tasks. The artifact is a small, T-shaped or winged specimen, made of heat treated, reddish brown chert. The lightly worked base or stem of the piece is 18 mm wide; the bit, or blade, is approximately 20 mm long and has a maximum width of 7.5 mm and a maximum thickness of 4 mm. The latter is lozenge-shaped in transverse cross-section, quite slender, and finely flaked. The overall length of the artifact is 30.5 mm.

Bifaces: Twenty-four chipped stone artifacts were classified as bifaces. Eight are almost certainly fragments of small, thin projectile points of the Fresno, Harrell, Reed, Huffaker, or Scallorn types described previously. Six are distal (tip) sections, one is a midsection, and one a basal section. The latter is notched, but it is uncertain as to whether a basal notch or a side notch is represented. Two of the tip sections are made of field chert; the others are made of various kinds of heat treated cherts. All but three of the eight probable small point fragments were found in the plow zone. Of the three exceptions, two were discovered at a depth of 20-30 cm, in X24 and X35, respectively, and may have been contained within the plow zone. The other was found at a depth of 30-40 cm in X6, in close proximity to Feature 28, the burned rock concentration.

Two other possible projectile point fragments were found. One, a small midsection, was recovered from the plow zone. It is 5 mm thick, somewhat thicker than the point fragments just discussed, and may be from a slightly larger projectile point or knife. It is made of heat treated, pinkish gray chert. The other possible point fragment is the tip section of an apparently medium sized projectile point or knife. Recovered from the 20-30 cm level of X43, it is 4.5 mm thick and made of gray chert.

One biface, Figure 8, U, recovered from the plow zone, is likely a small knife. Made of field chert, it is a relatively thin, fan-shaped specimen, 6.5 mm thick, 45 mm long, and 28 mm wide.

The remaining 13 bifaces to be discussed are all crudely flaked and relatively unshaped specimens. Functionally, they may have been crude cutting tools or simple test

pieces. Twelve of the group were found in or immediately below the plow zone; the other was recovered from 40 cm below surface in X40.

Endscrapers: Two snubnosed endscrapers were discovered at 14LT315 in 1980. One, a large, somewhat crudely flaked specimen of fossiliferous gray chert, was found at a depth of 40-50 cm below surface in X43. It is plano-convex in longitudinal cross-section and dome-shaped in transverse cross-section, and has a blocky, unfinished base or proximal end. The artifact is 50 mm long and has a maximum width of 30 mm and a maximum thickness of 15 mm.

The other endscraper was recovered from the plow zone of the site. Made of a long, narrow, fortuitously shaped flake of black chert, the artifact has been rather lightly worked, with the flaking being confined to the distal end and most of one lateral edge. Cortex remains over most of the dorsal surface of the specimen, which is dome-shaped in transverse cross-section and concavo-convex in longitudinal cross-section. The artifact measures 49 mm long and has a maximum width of 16 mm and a maximum thickness of 9 mm.

Unifaces: Twelve unifacially worked pieces of chipped stone were collected from 14LT315 during the 1980 field season. One, made of gray chert, may be the proximal or butt end of an endscraper. It was discovered at a depth of 20-30 cm below surface in X43. Two others, recovered from the plow zone in X40 and X43, respectively, likewise may have been used or intended for use as endscrapers. Both are made of the same distinctive black chert as that of the black chert endscraper already discussed, and both have the same narrow, concavo-convex shape as that artifact. One of the two flakes is whole; the other is badly broken at the apparent bit end. The unbroken specimen exhibits slight utilization wear along its one snubnosed end and hafting breakage along one lateral edge. Cortex covers almost all of the dorsal surface of the artifact. The other specimen is steeply retouched along both lateral edges and exhibits very little cortex, but the apparent bit end of the artifact is unfinished and is badly battered, possibly the result of having been broken during use.

The other nine unifaces exhibit retouching along one or two of their edges, but none of the nine appear to have been shaped into a definable tool type. One is made of gray chert with white limestone cortex and another is made of field chert. The other seven are made of different kinds of heat treated chert, including three of Florence chert.

Utilized flakes: Eight flakes exhibit slight utilization wear along one edge, likely resulting from incidental use as scraping or cutting tools. Five are made of field chert, two of Peoria chert, and one of a dark brown chert. All were recovered from within or just below the plow zone.

Cores: Nine cores were found at 14LT315 in 1980, along with some 300 chunks of field chert which could qualify as incipient cores since one or two flakes appear to have been struck off them. Many of the latter are little more than shatter and some may have been naturally fractured rather than culturally modified. All are covered in part by cortex, and few appear to have been heat treated.

The nine identified cores include one of a coarse textured white chert, possibly Peoria, four of field chert, and four derived from small river rolled specimens. The white chert core is comparatively regular in form, a small, ovately shaped, blank decortication core nucleus with numerous flake scars forming a sinuous bifacial edge. The other cores are all irregularly worked, with two of the field chert specimens having a sinuous edge. In terms of provenience, the cores were found at scattered locations and at various depths throughout the site.

Debitage: A total of 2,141 pieces of chipped stone debitage, consisting of 1,589 waste flakes and 552 pieces of shatter, was recovered from the site. In terms of decortication, the inventory includes 93 primary, 455 secondary, and 1,041 blank decortication flakes, and 70 primary, 242 secondary, and 240 blank pieces of shatter.

All the debitage is made of chert, with several different kinds of chert being represented. Field chert accounts for 51 percent of the inventory. Some 60 small, unworked pieces of field chert, mostly cortex covered, were also found, probably shatter derived from the initial flaking of field chert cores. Some may have arrived at the site naturally through alluvial action. Ten percent of the debitage inventory consists of material identifiable as being derived from three different river rolled cobbles. Florence and Peoria specimens each account for 6.0 percent of the debitage, with the remainder, 27 percent, being taken up by various "other" cherts. Five flakes of black chert are included in the latter group.

In terms of heat treatment, much of the 14LT315 debitage appears to have been heat treated, although it should be noted that heat treatment is somewhat difficult to determine on the field chert. Eighty-four percent of the

Florence chert, probably half of the Peoria, material from two of the three river rolled cobbles, 42 percent of the "other" chert category, and 18 percent of the field chert appears to have been heat treated.

The provenience of the debitage is somewhat revealing in terms of the vertical distribution of the site. Approximately 62 percent of the debitage was contained within the plow zone, in the uppermost 20 cm of the site, and another 20 percent was found within the 20-30 cm levels, the upper portions of which consisted of plow zone. Debitage density diminished rapidly below the plow zone, generally paralleling the rest of the artifact assemblage. The 30-40 cm levels contained 12 percent of the debitage, the 40-50 cm levels, 5.0 percent, and the 50-60 cm, 60-70 cm, and 70-80 cm levels each contained approximately 1.0 percent. A total of 118 pieces of debitage, including all the major varieties of chert discernible at the site, was recovered from the 30-40 cm and 40-50 cm levels of X6 and X28 in close proximity to Feature 28, the burned rock concentration, which contained six waste flakes within its fill. Most of the Florence and Peoria chert at the site was found in the plow zone or immediately underneath it in the 20-30 cm level, primarily in the excavation units at the western end of the site. At the other extreme, field chert accounts for almost all of the debitage recovered from the lowest levels of the site, between 50-80 cm below surface.

Ground stone artifacts: The 14LT315 ground stone artifact inventory is not extensive, consisting of part of a muller and part of a grinding slab. Both artifacts are made of the locally abundant brown sandstone. The extant portion of the muller comprised one end of the original artifact, which was at least 97 mm wide. The grinding slab fragment consists of a small portion of the original artifact, and exhibits a concavely ground face with several striations.

In the context of ground stone artifacts, it is appropriate to mention the finding of 66 pieces of hematite and 23 pieces of limonite at the site. Most of these are very small fragments, and none are larger than thumb sized. None are worked, and their presence at the site could quite possibly be due to alluvial deposition. Nevertheless, they could represent the remains of hematite and limonite used as a source of pigment or for the tempering of pottery. As with the pottery and chipped stone artifacts, their vertical distribution is characterized by an abundance in the upper levels of the site and a sharp diminution in the lower levels, below the 30-40 cm level.

Faunal Remains

The 1980 excavations at 14LT315 produced approximately 55 pieces of bone and two pieces of tooth enamel, presumably the remains of animals hunted or trapped by the prehistoric inhabitants of the site. Four of the bone fragments have been burned; the others have not. One section of bone was identifiable as being the anterior end of the base of a vertebrae, probably that of a deer (Odocoileus sp.). Another was identifiable as the distal end of the left tibia of a larger animal, possibly elk or wapiti (Cervus canadensis) but probably bison (Bison bison). The remainder of the inventory could not be specifically identified. Most of the material appears to be fragments of long bones of large animals such as deer, elk, or bison, and the two tooth fragments are also indicative of such animals.

In terms of provenience, the faunal material was contained entirely within the upper 40 cm of the site. One small unburned bone fragment was present among the fill of Feature 28, the burned rock concentration. Nearly half the bone fragments, including the tibia fragment and another comparatively large section of a long bone, were found at a depth of 25-35 cm below surface in X4 and X9.

Floral Remains

Charcoal fragments comprised the only floral remains encountered at 14LT315 in 1980. The fragments were concentrated in F28, the burned rock concentration, and in F30, the putative post mold. Neither feature produced enough charcoal for reliable radiocarbon dating.

SUMMARY AND CONCLUSIONS

The 1980 investigation of 14LT315 involved the systematic excavation of sixteen 2 m² excavation units and six 45 cm² test pits. The excavations revealed that even though the majority of the artifacts were contained within the plow zone in disturbed context, cultural remains were present in primary archeological context underneath the plow zone. The bulk of these latter remains were located in a 15-25 cm band immediately underlying the plow zone. A few artifacts were found in random locations within the general site fill at somewhat lower depths, but their provenience is considered to be due to natural factors rather than cultural occurrences.

The topographic location of the site is such that it would have been flooded on numerous occasions, thus some

30-40 cm of soil had eventually built up over the initial occupation levels. This phenomenon was inferred by the writer from the location of the nonportable features found in the various excavations. The orifice of the possible post mold found in 1976 was at a depth of 20 cm below surface, at the base of the modern plow zone, and the orifice of the apparent post mold found in 1980 was at a depth of 32 cm below surface. The burned rock concentration found in 1976 was at a depth of 30 cm below surface, and the burned rock concentration found in 1980 was at a depth of 32-45 cm below surface. One suspects that the latter feature was contained within a pit or natural depression, although no evidence of one was recognized. It seems evident that the living surface of the initial Pomona occupation was located at or just above the level of those four features, that is, between 20-45 cm below the present ground surface and more likely around 30 cm. The accretion of soil above these features is considered to have resulted from silt deposition due to periodic flooding and silting over the years. Alluvial soil accumulation of this sort is not unique and has been noted at archeological sites before, for example at the William Young site in Council Grove lake. There, some 5.0 ft of soil accumulated, apparently in a relatively short time, over and among the remains of a single archeological culture, with artifacts and other debris being present all through the zone (Witty 1982:198-201). The occupation of 14LT315 was probably of a similarly continuous but intermittent nature involving a continuing cycle of occupation, abandonment, flooding and silting, and subsequent reoccupation.

The flooding undoubtedly disturbed the portable archeological remains at 14LT315 by moving them about both horizontally and vertically, and at times could have resulted in the erosion of soil and the displacement and removal of the lighter archeological materials (i.e., charcoal, small bone and shell fragments, etc.) as well as the subsequent deposition of silt and burial of other site elements. As noted earlier in this report, erosion and deposition of this sort has been noted by Society investigators before in the Big Hill creek valley. In the case of 14LT315, cultivation of the area during the modern era undoubtedly confused the situation still further by mixing and compressing the uppermost cultural materials. Half of the pottery assemblage, for example, was found in the plow zone, another 15 percent from 20-30 cm below surface, and another 28 percent from 30-40 cm below surface, while only the remaining 7.0 percent came from below 40 cm. Chipped stone debitage provenience was equally revealing, with 62 percent coming from the plow zone, 20 percent from 20-30 cm below surface,

12 percent from 30-40 cm below surface, and only 5.0 percent from 40-50 cm below surface. After allowing for artifact displacement downward through the actions of burrowing animals, drying cracks, and other natural factors, and taking into account the variations in surface elevation of the various excavation units, it is inferred that the Pomona occupation(s) took place, at least initially, at an elevation of around 30-40 cm below the present ground surface. The relatively wide vertical distribution of the various cultural remains is considered to be due to flooding and associated silt deposition combined with continued intermittent use of the site over a number of years.

Materials coming from below these levels, specifically two medium to large sized projectile points, one from 52 cm below surface and one from 70-80 cm below surface, may represent an earlier component although there is little or no other evidence to support this conclusion. The two points are not out of place in a Pomona inventory, but they are more typical of Early Ceramic assemblages. Taking into account their relatively deep provenience below what appears to be the Pomona living surface, it can be tentatively inferred that they represent an earlier component. The tentative nature of this inference must be emphasized, however, due to the lack of any other deeply buried occupational debris or features.

While the above equivocation must be considered, it is clearly evident that the bulk of the artifact assemblage is representative of a Pomona occupation. The pottery, for example, has all the characteristics of Pomona ware. The projectile point inventory, with its predominance of small triangular points and minority of larger corner notched or stemmed points, likewise has all the trappings of a Pomona assemblage. On an individual basis, all of the small triangular points are stylistically or typologically attributable to a Middle or Late Ceramic time frame. The small corner notched Scallorn points occur in both Early and Middle Ceramic context and are often found at Pomona sites. The larger corner notched and stemmed points are, in the main, an Early Ceramic manifestation, but are often found as a minor element in Pomona assemblages.

Other artifacts which are not culturally diagnostic but which indicate functional activities include a drill or perforator, assorted bifaces, endscrapers and unifaces, utilized flakes, cores and debitage, and portions of a sandstone muller and a grinding slab. Unworked hematite and limonite were also present. Other archeological materials include a few pieces of animal bone and teeth. One bone

could be positively identified as deer, and another as bison or elk. The remainder were less specifically identifiable as being from a large animal such as deer, elk, or bison.

Unfortunately, the buried house floor suspected to be present on the basis of the 1976 tests was nowhere found, nor was daub. One post mold was encountered, but it was an isolated phenomenon apparently unassociated with any habitation features. In sum, no clear evidence of a habitation structure was found, although there was abundant evidence that a fairly intensive Pomona occupation occurred at the site.

INVESTIGATIONS AT 14LT316

Archeological site 14LT316 occupies an oval area around two acres or little less than a hectare in size on the end of a narrow necked, westerly pointing alluvial terrace ridge on the left (east) bank of Big Hill creek (Figure 3). A wide expanse of lower lying bottomland lies to the southwest of the ridge. The creek passes by the north edge of the site and loops around the bottomland area before swinging back up to touch near the south edge of the ridge. Steeply sloped uplands lie to the northwest of the site, on the opposite side of the creek. At an elevation of approximately 832 ft MSL, 14LT316 will be permanently covered by some 26 ft (8.5 m) of water when the Big Hill lake project is in full operation.

A north-south trending hedgerow forms a somewhat arbitrary eastern boundary to the site. Several other prehistoric sites are located at various distances to the east of the hedgerow on the same terrace as 14LT316, and may represent occupations contemporaneous with those at 14LT316. Both Early Ceramic and Middle Ceramic artifacts were found. Unfortunately, those sites appear to have been essentially destroyed by a devastating flood and subsequent cultivation in 1976 (Rowlison 1977:28, 71). The hedgerow seems to have protected 14LT316 from such a fate.

INVESTIGATIONS PRIOR TO 1980

Site 14LT316 was first recorded in 1972 by Society archeologist Thomas A. Witty, Jr. The site was under cultivation at the time, and chert flakes and sandstone fragments were observable on the surface of the field. A few soil probes with an Oakfield soil sampling tool revealed the presence of subsurface bone, burned earth, and charcoal, prompting a recommendation that the site be tested more extensively in the future. Witty found no culturally diagnostic artifacts, but his examination of artifact collections belonging to local informants enabled an Early Ceramic cultural affiliation to be inferred. According to the informants, artifacts had been collected from the site for almost four generations, with most of the finds consisting of large, stemmed projectile points.

In 1973, the site was partially excavated as the result of a contractual agreement between the Kansas State Historical Society and the National Park Service. Witty directed the fieldwork and served as the principal investigator. The investigation focused on two areas of the site, designated as Area 731 (A731) and Area 732 (A732), respectively. A731

was located on the crest of the southern point of the terrace, A732 on the western slope of the terrace (see Figure 9).

At A731, twenty-one 10 ft² excavation units and portions of nine others were dug, exposing a circular post mold complex interpreted as a buried house floor (Figure 10). Fourteen perimeter posts and four interior posts were evidently used in the construction of the house. The posts were large, the molds ranging from 0.6-1.0 ft or 18.3-30.5 cm in diameter. The posts were deeply set, from 1.1-3.3 ft or 33.5-110.0 cm deep, and were widely spaced, from 4.8-12.5 ft or 1.46-3.81 m apart. No entranceway was detected and it is uncertain as to whether the interior posts were roof supports or internal dividers and/or windbreak supports. A burned rock concentration, presumably a hearth, was present near the center of the house. The concentration was around 3.0 ft or 91.4 cm in diameter and consisted mainly of sandstone, along with small amounts of limestone, limonite, charcoal, and burned earth. Two small basin-shaped pits with straight to slightly insloping walls were also present, along the southeastern periphery of the house. One was on the outside, adjacent to the wall; the other was inside but adjacent to the wall and may have extended to the outside of the house. One of the perimeter post molds was centered in the north edge of the latter pit. It is uncertain as to whether the posthole or the pit was intrusive into the other.

The house floor was some 40 ft or 13 m in diameter, encompassing an area of around 1,256 square feet or 116 square meters. Using Naroll's (1962) and LeBlanc's (1971) conclusions regarding estimation of population from floor area, it is inferred that around a dozen people lived in the house. The size of the house and the number of people suggest an extended family form of social organization, and drawing on Ember's (1973) remarks, a matrilineal post-marital residence pattern can be postulated.

At A732, seven 10 ft² excavation units and a portion of one other were dug, revealing the presence of a linear trash midden of uncertain extent. The midden contained relatively abundant artifactual and faunal remains along with charcoal, burned earth, and burned rock. Two post molds were found, one in the northwest corner of the excavations and one in the southwest. The one in the northwest corner was described as being 0.9 ft (27 cm) in diameter and 1.9 ft (58 cm) deep. The functional purpose of these two features was not determined. Unfortunately, the available time and funding did not allow for a more definitive investigation of

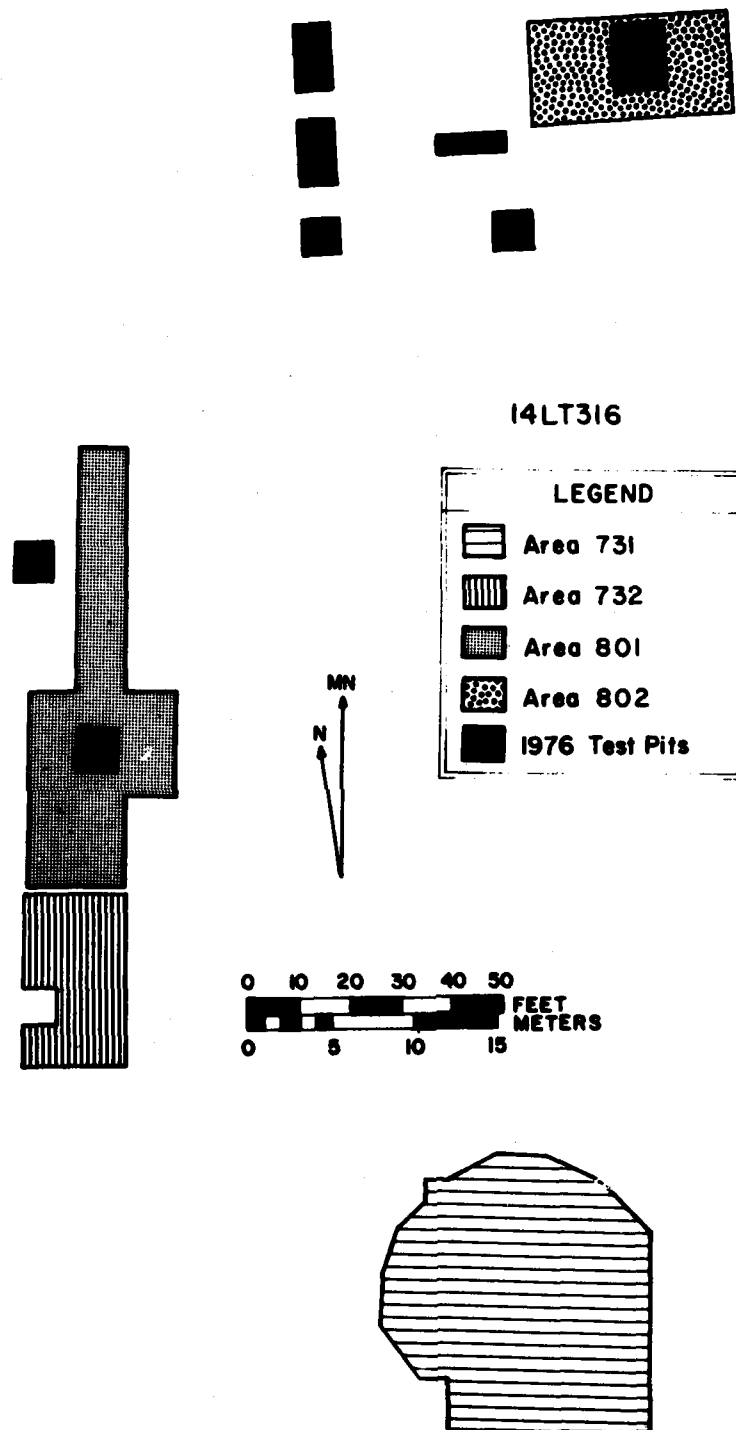
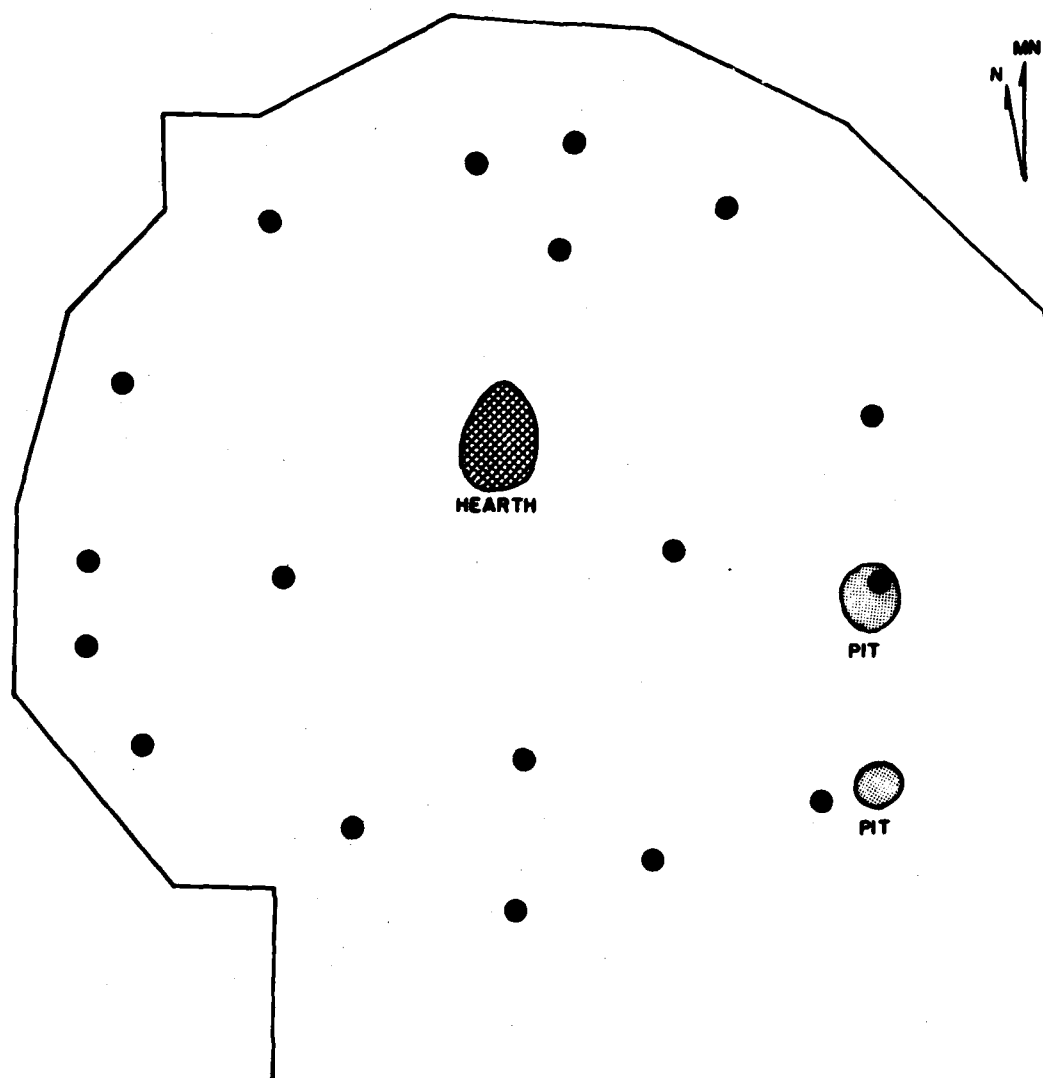
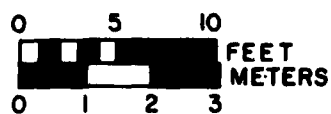


FIGURE 9. Map showing the location of the various areas designated at 14LT316.



HOUSE 1

Area 731, 14LT316



LEGEND

- Limits of Excavation
- Postmolds

FIGURE 10. Map of House 1, Area 731, 14LT316.

the deposit. In hindsight, however, the remains were not as abundant as those found to the north in the 1980 investigation of A801, and it is assumed that the A732 excavations took place in what amounts to the south end of the midden (Witty 1981, personal communication).

Cultural materials accrued as a result of the 1973 excavations remain in the collections of the Historical Society and have been analyzed by Don Rowlison in preparation for a report to be written for the National Park Service. A cursory examination of the material by the present writer revealed that the artifacts from the house (A731) correspond almost exactly to the artifacts recovered from the midden in 1973, 1976, and 1980. In some cases, chipped stone artifacts from the house and the midden are not only morphologically identical but can be identified as having been made from the same exact kind of chert and probably even the same core. All in all, there is no question but that the trash in the midden originated in the house, and that the two manifestations represent a single component.

All of the Cuesta ware pottery derived from the 1973 investigation is essentially identical to that recovered in the midden excavations of 1976 and 1980. Pottery was not abundant in the A732 portion of the midden, only 28 body sherds being found. All are indurated clay tempered and smooth surfaced; 13 are decorated by means of zoned or unzoned dentate stamping. They are clearly identifiable as Cuesta ware (c.f. Marshall 1972:49-55). Pottery from the A731 house excavation was even more sparse, with only 24 sherds being found. Seven of the 24 appear to be intrusive. Two smooth surfaced body sherds, which fit together, have a "trash" temper of a sort noted before by Rowlison (1980:36); they are unlike any others in the 14LT316 inventory and not surprisingly, they were found in the plow zone. All the other A731 sherds are tempered with indurated clay, but five sherds have cord-roughened exteriors at variance with the smooth surface treatment seen on the others. Significantly, one of the sherds was found on the surface of the site and the other four were found in the plow zone in peripheral locations along the southeastern edge of the house excavation. It is inferred that these sherds are unconnected with the Cuesta occupation and represent an intrusive surface veneer deriving from the Pomona occupation in the northeastern corner of the site, or from other Pomona sites to the east of 14LT316. All sherds found in undisturbed subsurface context on the house floor were clearly identifiable as Cuesta ware. Included within that inventory are 17 undecorated body sherds and two small, tool impressed rim

sherds. One rim sherd has a shallow, 4 mm wide tool impression applied in a right oblique fashion to the exterior edge of the lip, with the impressions spaced 4 mm apart; the other sherd has a deep, well-rounded tool impression 5-6 mm apart laid directly across the lip, perpendicular to the path of the rim.

Projectile points and other lithic artifacts from A731 and A732 are of a similarly Early Ceramic nature. The projectile points are small, medium, and large in terms of size and almost all are corner notched or stemmed. Rowlison's analysis (personal communication, 1981), drawing on type descriptions published by Bell (1958, 1960) and Perino (1968), lists such point types as Edgewood, Ensor, Gary, Haskell, Lange, Langtry, Marcos, Palmillas, Scallorn, Wells, Williams, and Young. Most of the points are of the Gary, Langtry, Marcos, Ensor, and Scallorn types. A few small, unnotched, more or less triangular-shaped specimens are present, but in all cases these appear to be preforms or possibly Catan points or preforms. None appear to be of the later Fresno variety.

Other notable but less culturally diagnostic finds of the 1973 season include a few endscrapers or endscraper-like unifaces, two knife/scrapper combination tools similar to artifacts found at the Infinity site at Elk City lake and listed by Marshall (1972:70) as "Group VI," two hematite choppers, three hammerstones, one grooved sandstone flint-knapping abrader, two nutting stones, a section of a ground and polished diorite celt or axe, and a section of a ground sandstone gorget or pendant. Cores and debitage were also found, as were a number of ground sandstone fragments, some of which may be sections of grinding slabs or mullers.

In 1976, the north half of the site was tested by a small crew under the direction of Society archeologist Don D. Rowlison (1977:99-112). The testing was prompted in part by private collector's reports of finding cord-roughened pottery sherds in the northeastern third of the site, sherds which suggested the possibility of a Middle Ceramic component. One rectangular 4 by 3 m excavation unit and two other test pits were thereby dug in the northeastern area, to depths of up to 35 cm below surface. Soil probes were also taken, with the Oakfield soil sampling tool. Unfortunately, no diagnostic artifacts were found. In fact, the excavations produced very few artifacts, almost none from below the plow zone. The most significant result of this portion of the testing was the finding of two features interpreted as post molds in X8, the most northeasterly of the excavation units. The two features were approximately

120 cm apart and were oriented in an east-west direction. Both were discovered at a depth of approximately 35 cm below surface. One was 24 cm in diameter and tapered vertically downward to reach a length of 84 cm. The other was 12 cm in diameter and tapered to a length of 63 cm. The fill of the smaller feature contained no cultural materials whatsoever, while that of the larger contained small flecks of charcoal and one chert waste flake. The putative post molds were interpreted by Rowlison as indicating that "...some form of superstructure..." may have existed at one time in this area of 14LT316 (1977:111).

The testing also involved the excavation of five 2 m² test pits in the north central part of the site, which produced no significant archeological remains, and the digging of two 2 m² excavation units, X10 and X11, in the midden area along the west portion of the site. The latter units were positioned to the north of the 1973 excavation units (A732) in an attempt to ascertain the northern extent of the midden and determine the archeological potential of the northern area. As was later determined in the 1980 investigation, X10 was fortuitously positioned in the center of the midden, while X11 was on its western edge. An abundance of faunal remains and Cuesta phase artifacts, including a restorable pottery vessel (Rowlison 1977: Plate 9), was recovered from X10. Cultural remains were also fairly abundant in X11, but somewhat less so than in X10. Excavation unit 11 did, nevertheless, contain one significant cultural feature, interpreted as a post mold. The feature was circular and 16 cm in diameter at its orifice, and tapered to a conical end 47 cm below the base of the plow zone. The fill of the feature included dark humus-like soil intermixed with small pieces of charcoal.

Numerous burned and unburned animal bone fragments were recovered in 1976, almost entirely from the midden area. Most of the fragments were poorly preserved and could not be specifically identified. Those remains which were identifiable included those of deer, turtle, bison, beaver, and turkey (Rowlison 1977:111).

The 1976 testing indicated 14LT316 to have a definite and compelling potential for the discovery of additional significant archeological information. The two putative post molds in the northeastern portion of the site suggested that structural remains, possibly a buried house floor, might be present, and artifacts reported from that area indicated that such remains could derive from another culture and represent a different component than that represented by the Cuesta material found in the southern

part of the site. Testing for the northern extent of the midden area along the western periphery of the site revealed moreover that only a portion of the midden had been excavated in 1973 and that "...a more comprehensive artifact assemblage and prehistoric environmental data..." could therefore be obtained from that area (Rowlison 1977:111).

Rowlison noted further that areas adjacent to and partially including 14LT316 had been designated for timber clearance, and that if heavy machinery was utilized in the clearing activities, the site's cultural resources would be adversely affected by the weight of the machines or the subsequent soil displacement. It was also pointed out that the site would be inundated and thus made inaccessible when the reservoir waters were impounded in 1981. Taking all these factors into account, Rowlison recommended that mitigation measures should include additional and more extensive archeological investigations and that the site be considered as one with an extremely high priority for such work (Rowlison 1977:112, 138).

1980 INVESTIGATIONS

The 1980 investigation of 14LT316 began with a brief pedestrian inspection of the site. No surficial cultural materials were found at that time, largely due to a thick cover of vegetation and vegetational debris. Work thereupon began on the midden area of the site, designated A801. About half way through the A801 excavations, and partially due to problems with rain, the investigation shifted to A802. When excavations in that area proved fruitless, the remaining part of the field season was spent at A801.

Excavations at Area 801

Using field notes, maps, and datum from the 1973 investigation, the north end of the A732 excavations was located and used as a starting point for the A801 excavations. A locational grid of 3 m² units was established and excavation was begun. By the end of the season, 15 excavation units had been excavated to depths ranging from 55-80 cm below surface (see Figure 11).

The research design employed during the investigation centered on determining the limits and excavating as much as possible of the midden. The vertical and lateral limits and linear nature of the midden were determined during the digging of the initial 10 southerly units, particularly X9, X4, and X16, the most northerly of those 10 units. Vertically, it was clear that three distinct soil strata were

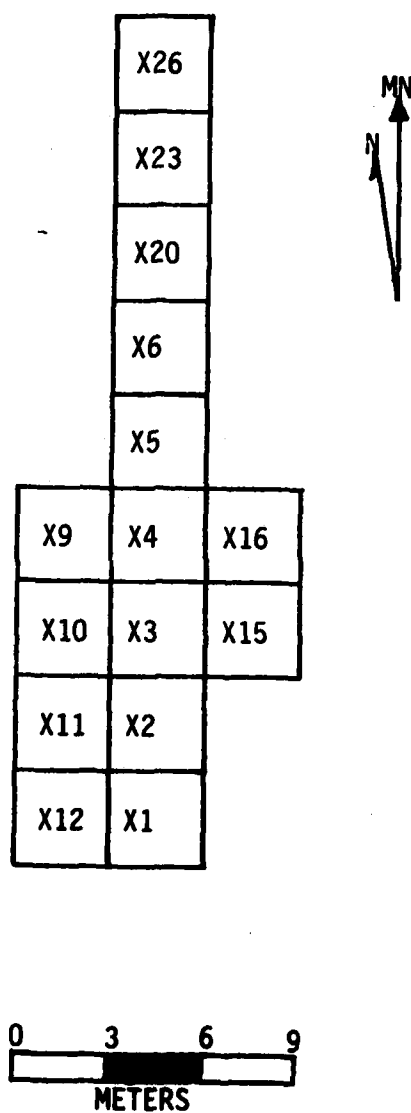


FIGURE 11. Map showing the location of excavation units dug at Area 801, 14LT316.

present. The plow zone, varying from 15-23 cm in thickness, was comprised of a light grayish brown dirt, a rather typical silt loam. Dry, it had a Munsell color designation of 10YR 4/4. Immediately underneath the plow zone was an undisturbed cultural zone, the midden deposit, containing artifacts, faunal remains, charcoal, burned earth, and rock within a friable but somewhat clayey textured dark grayish brown soil matrix. Dry, the soil was classifiable as 10YR 3/2, and moist, as 10YR 3/1; occasionally, it appeared to be almost black due to charcoal flecking. The cultural zone gradated into an underlying sterile zone consisting of a relatively featureless light tan colored soil with a somewhat clayey texture. It was classified as 10YR 5/3. The base of the midden was about 50 cm below surface in the southern excavation units but extended somewhat deeper in the north, down to a maximum of about 75 cm below surface in X23 and X26. The modern topography accounts at least in part for the varying depths, since the terrace on which 14LT316 is located slopes gently to the southwest in the A801 area.

Delineation of the lateral limit of the midden revealed that trash had been deposited in a gully or ravine rather than on a flat surface. As is apparent in Figure 12, in transverse cross-section the midden was essentially a broad, shallow, U-shaped deposit, shallowly sloping on the west, sharply sloping on the east, deepest in the center.

Once the lateral and vertical limits and the northerly trending, linear nature of the midden had been established during the initial excavations, the remainder of the A801 investigation aimed at proceeding to the north as far as possible, digging the excavation units positioned in the center of the midden. Unfortunately, the end of the midden was not reached within the allotted time, despite the digging of five more excavation units, X5, X6, X20, X23, and X26. It thus did not prove possible to dig all of the midden or to determine its full northerly extent.

Cultural Features at Area 801

A variety of burned rock concentrations, sherd complexes, soil stains, and individual artifacts were given feature status during the excavation of A801. The burned rock concentrations consisted of limestone and sandstone accompanied by charcoal, burned earth, and occasional artifacts. None of the concentrations appeared to represent in situ hearths, and it is assumed that they derive from the dumping of hearth debris. Several discrete clusters of

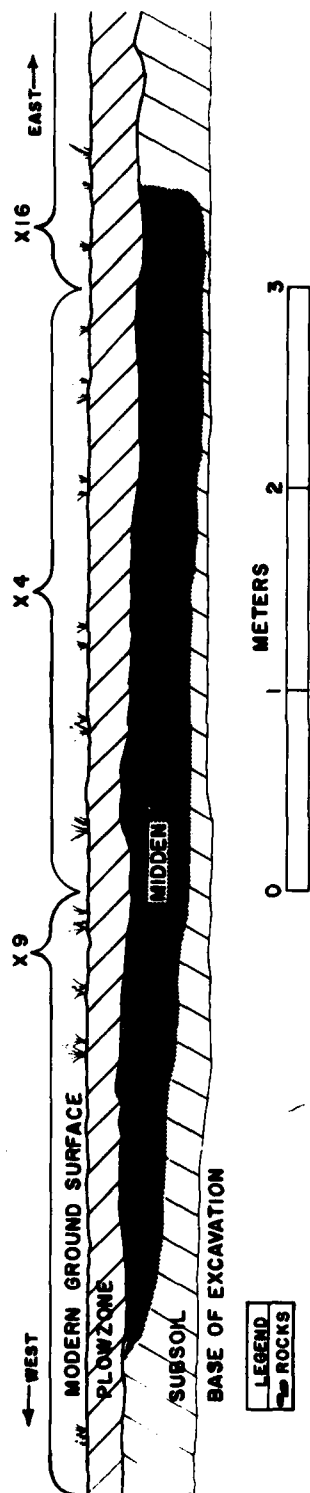


FIGURE 12. Vertical profile drawing of the north walls of X9, X4, and X16, Area 801, 14LT316.

burned rock were found but in general, burned limestone and sandstone occurred in a ubiquitous manner, scattered throughout the midden area.

Pottery sherds displayed a similar distribution, being found in isolated context and in clusters. One such cluster was both large and informative and deserves mention here, but most of the concentrations involved no more than a few sherds and need not be discussed further. Feature 288 was somewhat significant in that it represented the remains of a single broken pottery vessel, described in more detail in a later section of this report. The feature consisted of some 64 pottery sherds located in the northeastern corner of X1 at depths ranging from 40-53 cm below surface. Burned earth and charcoal flecking and one waste flake were also present within the cluster of sherds. Horizontal dimensions of the concentration were about 20 cm in a north-south direction and 25 cm in an east-west direction.

A variety of soil stains were encountered during the excavation, as might be expected in an area of mixed trash and soil utilized by burrowing animals as well as by Man. Most of the stains were cored and found to be rodent runs or krotovina of some other kind. One stain, located in the northwest quadrant of X9, proved to be a post mold. The feature contained abundant burned earth and charcoal, along with a few small bone fragments, within a friable dark grayish brown soil matrix. The post mold was first recognized at a depth of 50 cm below surface, but the orifice may have actually been somewhat higher. Burned earth and charcoal were still relatively abundant in the 40-50 cm level of the excavation unit and the post mold had been disturbed to some degree by rodent activity, hence it was difficult to detect the orifice in horizontal cross-section. At the point of encounter at 50 cm below surface the orifice was approximately oval, measuring around 24 cm in a north-south direction and 18 cm east-west. The post mold was cored and found to extend vertically downward to a depth of approximately 89 cm below the point of initial encounter, or approximately 139 cm below surface. The feature tapered towards the bottom, coming to a point 6-8 cm in diameter at the end. Several rodent runs intersected the post mold in various places, probably accounting for the few pieces of bone which were found. The functional purpose of the post remains uncertain. Given its location along the west edge of the midden, its inclusion as part of a habitational structure does not seem likely.

Archeological Materials from Area 801

The A801 excavations revealed that an abundance of artifacts, animal bone, burned earth, charcoal, and burned

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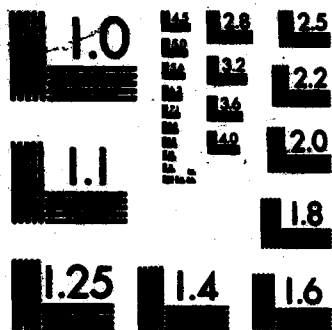
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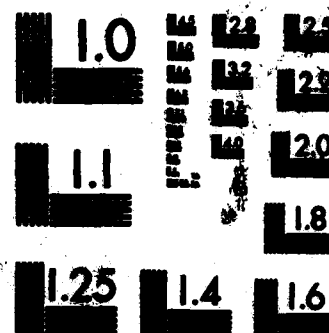
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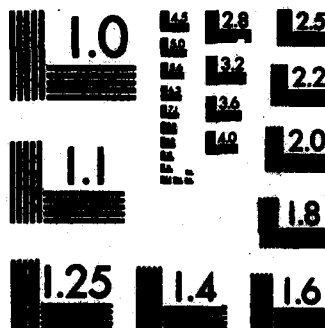
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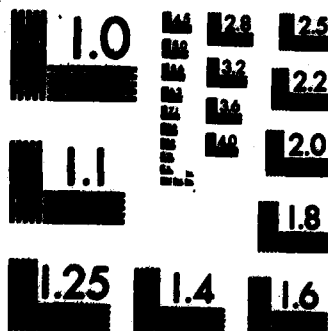
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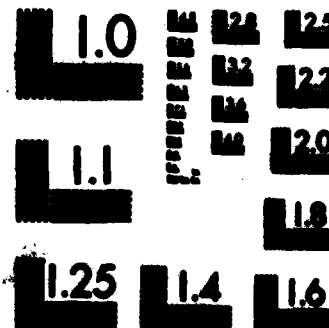
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and unburned rock was present in the midden, along with a few charred floral remains. Mollusc shell was nowhere observed. All artifacts and animal bone encountered during the investigation were collected.

The water flotation technique was used to collect floral remains. Charcoal concentrations were sampled for use in radiocarbon dating, but no attempt was made to collect all the charcoal encountered since much of it occurred as small flecks which could not have been satisfactorily collected. Likewise, no attempt was made to collect all the burned earth, much of which consisted of scattered flecks. Larger pieces of burned earth were saved. Virtually none of the uninformative hearth rock, burned limestone and sandstone, was collected, but unworked hematite and limonite fragments were saved since they may represent pigment sources.

One historic artifact, a small ceramic pipe fragment, was found during the A801 investigation. The fragment consists of part of the bowl portion of a molded clay pipe of the type common to the days of Euro-American settlement. It was recovered from the 20-30 cm level of X5 and was assumedly in the plow zone. It obviously has no relationship to the Cuesta component and hence will not be discussed further.

Ceramic Artifacts

A total of 490 pottery sherds and several hundred pieces of burned earth was accrued as a result of the A801 excavations. The pottery includes 38 rim sherds, 10 decorated body sherds, and 442 undecorated body sherds. Various differences and similarities in temper, texture, color, decoration, and morphology suggest that the inventory represents the remains of at least 18 different pottery vessels, one of which was sufficiently represented as to allow for reconstruction (Plate 1).

All of the A801 sherds exhibit plain, smoothed-over exterior surfaces. Smoothed-over cord-roughening was faintly discernible on the surfaces of 11 body sherds, comprising around 2.0 percent of the inventory. One other sherd was somewhat rough surfaced, with a number of small pits or impressions. The surface is probably the result of weathering but may represent a dentate decoration, as will be discussed later in this section. Interior surfaces of the A801 sherds were typically plain, but some 9.0 percent



PLATE 1. Restored pottery vessel from A801, 14LT316.

of the inventory, all body sherds, displayed scraped or wiped interiors. The scraping and/or wiping striations appear in all discernible instances to have been horizontally oriented.

With one notable exception, to be discussed shortly, the A801 sherds are tempered with indurated clay. The tempering particles range in size from very small up to approximately 4.5 mm in diameter. Small hematite and manganese inclusions, assumedly natural constituents of the clay, are also common. Surface textures of the sherds range from light orangish tan to dark brown. Core colors are much the same, although various shades of gray are also common.

The exception to the indurated clay tempering "rule" consists of three grit tempered sherds, a rim sherd and two decorated body sherds, which fit together and represent a single vessel. All three were recovered from a depth of 40-50 cm below surface in X1. The temper consists of small and generally angular particles of quartz, mica, and white orthoclase and appears to be crushed granite of medium abundance. Surface textures of the three sherds are medium coarse, and the core textures are fairly compact. The sherds differ further from the rest of the A801 inventory in having a dark brown to dark gray surface color and a dark gray, almost black core color. Their decoration, to be discussed shortly, also differs dramatically.

Morphologically, the inventory represents the remains of conoidal, jar-type vessels with short rims, unconstricted or slightly constricted and sometimes almost nonexistent necks, steeply sloping shoulders, and conical bases. The rim of one vessel, represented in the inventory by one rim sherd, was very slightly incurving. All the other sherds appear to represent vessels with much the same morphological configuration as is evident for the single restored vessel recovered during the investigation and pictured in Plate 1. Lips on the rim sherds are variably shaped, ranging from flat to rounded. Most are somewhat thick due to being tool impressed, the clay having been pushed downward and outward in the process. The lip of the grit tempered rim sherd, however, is decidedly flat and squared off. It is 9 mm thick. Lips on the other rim sherds, excluding the 15 rim sherds of the restored vessel, range from 5-9 mm and average 7.1 mm thick. The rims typically thicken somewhat as they descend from the lip, expanding to an average of 7.2 mm in thickness with a range of 6.0-8.5 mm. Rim sherds on the restored vessel have lips ranging from 6.0-8.5 mm in thickness, with an average of 7.25 mm. Body sherds attributable

to that vessel average 7.33 mm thick, with a range of 5.5-10.5 mm. The other A801 body sherds, excluding the two grit tempered body sherds, which are both 9.5 mm thick, range from 5.5-12.5 mm and average 7.95 mm in thickness.

The one restorable vessel (Plate 1) provided further and more informative morphological data. The vessel has a maximum height of 265 mm and a maximum outside diameter, at the shoulders, of 275 mm. The orifice interior has a maximum diameter of 220 mm, but in actuality the vessel is slightly elliptical in its horizontal dimensions, with interior orifice measurements of approximately 220 by 210 mm and exterior shoulder measurements of 275 by 260 mm. Using dry measure terms, the capacity of the vessel is around 8.75 quarts or 9.6 liters.

Decoration of the A801 pottery involved the use of a variety of techniques. Plain tool impressions of various sizes and shapes, cord-wrapped stick impressions, bosses, punctates, incised and trailed lines, zoned and unzoned dentate stamping, and plain rocker stamping were all found, sometimes in combination, in the inventory.

Three small rim sherds, apparently representing three separate vessels, display no observable or clearly identifiable decorative elements whatsoever, suggesting that undecorated vessels were produced as well as decorated ones. One of the three sherds, recovered from a depth of 30-40 cm in the balk wall between X3 and X10, is identifiable as being from the same vessel as a rim sherd found on the surface of the site in 1976 and reported by Rowlison (1977:107). The exterior surfaces of both sherds exhibit a number of small, variably shallow, and apparently randomly located pits or impressions. Rowlison somewhat equivocally described the 1976 sherd as retaining "...some decoration...which appears to be smoothed or weathered dentate stamping..." (1977:107). The present writer's examination of both sherds, however, resulted in a strong and continuing uncertainty as to the actual derivation or meaning of the pits or impressions. If dentate stamping is indeed present on the two sherds, it is of an irregular, unpatterned, amorphous nature. For this reason, the sherd has been classified--albeit with some uncertainty and equivocation--as being undecorated.

Overall, tool impressions are the most common form of decoration seen in the A801 inventory. Plain tool impressions applied to the lip and/or upper rim and apparently unaccompanied by any other decorative elements were found on 28 of the 38 rim sherds recovered. The 28 sherds make up portions of eight of the 18 vessels minimally represented by

the A801 pottery. Two of the rim sherds, representing a single vessel, have rounded tool impressions 3 mm in diameter, located on the lip at a left-oblique angle to the path of the rim. The impressions are spaced 3 mm apart and are 1.5 mm deep.

Seventeen other rim sherds, representing two vessels, one of which is the restored vessel pictured in Plate 1, exhibit tool impressions along the exterior of the lip and upper rim at the lip/rim juncture. On the restored vessel, the impressions are sharp, angular, vertically oriented gashes about 11 mm long, spaced 2-4 mm apart. On the other vessel, the impressions are likewise spaced 2-4 mm apart but are shallow and rounded in form, about 4.5 mm in diameter and 2 mm deep.

Four other rim sherds, representing two more vessels, have had shallow, rounded tool impressions applied to the interior edge of the lip and upper rim. On one of the two vessels, the impressions are 3.5 mm wide and 4.5 mm apart; on the other they are 4.5 mm wide and 6 mm apart.

Four other rim sherds, representing two separate vessels, display rounded tool impressions which were applied in an alternating fashion to both the inner and outer edges of the lip and upper rim. On all four sherds, the impressions are about 3 mm deep and fairly prominent. On one vessel, the impressions are 5.5 mm wide and the same distance apart. On the other, they are 3.5 mm wide and are variably spaced, from 1-5 mm apart.

Plain tool impressions were also found in isolation on one other A801 rim sherd, recovered from a depth of 60-70 cm in the balk wall between X6 and X20. Unfortunately, the specimen is totally uninformative in terms of vessel morphology and overall vessel decoration, since it consists of a small, thin, spalled-off portion of the exterior surface of a rim sherd. Although most of the lip has been broken away from the spall, two rounded tool impressions, 5.5 mm in diameter, spaced 5.5 mm apart, are discernible along the lip/rim juncture. The decoration is technically quite similar to that found on several other rim sherds from the site, but the sherd differs sufficiently in terms of color, surface texture, and provenience as to allow for counting it--albeit somewhat tentatively--as representing a separate vessel.

Similarly, one other rather uninformative sherd has been counted as representing a separate vessel, since despite its technical decorative resemblance to one of the

other vessels, specifically the restored vessel pictured in Plate 1, various differences in color, surface texture, provenience, and decoration suggest that it does indeed represent a different vessel. The sherd was recovered from a depth of 30-40 cm in X15. It is technically a body sherd, but its curvature and the presence of tool impressions indicate that it is actually a rim sherd from which the lip has been broken away. The sherd displays four, parallel, linear tool impressions, 2.0-2.5 mm in diameter and at least 10 mm long, spaced from 3.0-4.5 mm apart. The impressions were apparently vertically oriented on the upper rim, at and just below the lip/rim juncture. Thus, while the decoration is essentially quite similar to that of the restored vessel, the spacing and diameter of the tool impressions differ from those of that vessel.

A decorative design previously described in this section--plain tool impressions placed in an alternating fashion along the inner and outer edges of the lip and upper rim--is found on one other vessel, but in this case the impressions occur in conjunction with zoned dentate stamping rather than in isolation. The four rim sherds and three decorated body sherds representing this vessel were found in X3, X4, and X10, and are clearly recognizable as portions of the restorable vessel excavated during the 1976 investigation of the site and reported by Rowlison (1977:108-110 and Plates 8 and 9). The rim sherds display shallow rounded tool impressions approximately 4 mm wide, spaced 3 mm apart along the lip/rim juncture. Zoning of the vessel was accomplished by placing two horizontally oriented and roughly parallel trailed lines on the exterior rim surface. One line encircles the rim about 27 mm below the lip, and the other line is located a variable but approximately equal distance below the first. Within the band or zone created by the two lines, dentate stamping is present. The stamping consists of several horizontally oriented and occasionally overlapping rows of small dentate impressions, apparently produced by use of a roulette. The impressions are rectangular, measuring approximately 1 by 2 mm in size. In addition to these decorative elements, a conically drilled "crack lace" hole is also present on one of the rim sherds. The hole is located just above the zoned stamping, and is presumably functional rather than decorative in purpose, as will be discussed later in this section.

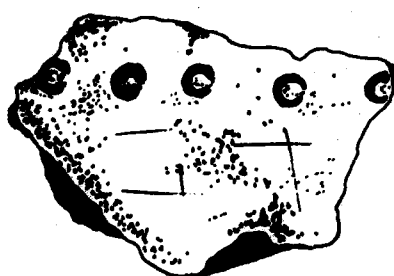
Cord-wrapped stick impressions comprise another form of tool impression found, in isolation, on two of the A801 rim sherds. The two sherds represent a single vessel which was decorated by applying a cord-wrapped stick, perhaps the edge of a cord-wrapped paddle, to the exterior edge of the lip

and upper rim at a right-oblique angle. The stick or paddle impressions are relatively shallow and approximately 5.5 mm wide. The cord used in producing the decoration was medium gauge in size, but due to the indistinctness of the cord impressions, the cord twist could not be determined.

Dentate impressions are also present on two other sherds from the site, two body sherds which fit together along with one undecorated body sherd and represent a single vessel. These sherds are definitely not attributable to the dentate stamped vessel derived from the 1976 investigation and described above, since they were recovered from X26, at quite some distance from the 1976 excavation, and display a slightly different decorative design. The observable decoration consists of two groups of at least six parallel rows of dentate impressions. No zoning lines are present on the sherds. The two groups of impressions are of indeterminate width and are separated by a plain surfaced area approximately 15 mm wide. The rows of stamping within each of the two groups are spaced about 3 mm apart. The dentate impressions within each row are roughly rectangular and relatively small, measuring approximately 1.5 by 2.0 mm in size. It is uncertain as to whether a roulette or a straight dentate stamp was used in producing the impressions. Unfortunately, the sherds are also uninformative in terms of vessel morphology and overall vessel design.

Tool impressions of a different sort--hemispherical punctates--were found on one sherd (Figure 13, A), a body sherd recovered from X6. The punctates are arranged in a row on the exterior surface of the sherd, but there are no indications as to where the row was located on the vessel. Likewise, the sherd is uninformative in terms of vessel morphology and overall vessel decoration. The punctates are circular in shape, but their somewhat angled application has resulted in a hemispherical appearance. The punctates are 4 mm in diameter and are variably spaced from 4.5-8.0 mm apart.

A distinctly different kind of decoration, plain rocker stamping, is present on one other body sherd (Figure 13, B), which was also recovered from X6 and is assumed to represent a separate vessel from the others. The curvature of the sherd indicates it to be from the shoulder and neck portion of the vessel, a vessel whose overall decoration cannot be determined due to the absence of a rim section. Decoration of the extant portion of the vessel consists of a slightly meandering, 13-14 mm wide band of rocker stamping, located on the shoulder a short distance below the neck. The



A



B



FIGURE 13. Selected pottery sherds from A801, 14LT316. Scale is full size.

stamping has relatively shallow relief and was produced by use of a plain surfaced rocker which resulted in a continuous, zigzagging, U-shaped line approximately 2 mm wide.

The last type of decorative design to be considered is that found on the three grit tempered sherds, which fit together and make up a fairly large and relatively informative section (see Figure 14), of a large sized vessel. Vertically, the section extends from the lip of the vessel down to the upper shoulder. The sherds and the vessel they represent are unique not only in being the only grit tempered specimens to be found at the site, but also in being the most highly decorated. At least as is indicated by the extant portion of the vessel, its decoration involved the use of embossing, trailing, plain ovoid stamping, and two different kinds of dentate stamping.

Beginning at the lip, on the exterior surface of the rim, a 20 mm wide band of dentate stamping is found. The stamping, which exhibits relatively deep relief and is quite prominent, consists of roughly vertical or slightly right-oblique rows of relatively large, rectangular-shaped dentate impressions measuring approximately 2.5 by 3.0 mm in size. The rows, two of which overlap slightly, are variably spaced up to 3 mm apart.

Immediately below the band of dentate stamping, a row of bosses encircled the rim, as evidenced by the single extant boss. The embossing was accomplished by punching a relatively large, cylindrically shaped dowel, possibly a broken twig, into the interior surface of the vessel. The tool was oriented at a perpendicular angle to the surface and was applied with enough force to extend some 8.5 mm into the wall. The embossing resulted in a large hole or punctation measuring approximately 9 mm in diameter on the interior surface of the vessel, and a prominent, ovoid-shaped node, or boss, on the exterior surface.

Beginning just below the embossing, four horizontally oriented rows of plain ovoid stamping are present on the neck and upper shoulder. The large, rounded, oblong to slightly ovoid impressions, which exhibit relatively deep relief and are quite prominent, were apparently made by impressing a plain surfaced stamp, perhaps the end of a paddle, into the exterior surface of the vessel. The stamp used in producing the impressions had a maximum width of 8.5 mm. None of the extant impressions are complete in terms of length, unfortunately, but judging from the observable regularities of size and shape, a stamp length (or paddle



FIGURE 14. Chert tempered pottery shards from
Area 1, T-147316. Scale is full size.

width) of approximately 48-50 mm can be inferred. The impressions are spaced 12 mm apart and the rows from 4-8 mm apart.

A meandering trailed line was placed a short distance below the rows of ovoid stamping. The line is 5 mm wide but quite shallow and indistinct. Its distance below the stamping is variable, ranging from 8.5-16.0 mm. The line forms an upper zoning periphery for a band of rather indistinct dentate stamping of shallow relief. Three horizontally oriented rows of dentate impressions are present on the extant portion of this section of the vessel, and more may well have been present on the vessel originally. The rows are spaced from 2.5-5.5 mm apart, and the impressions about 1.5 mm apart. The impressions are rectangular and fairly large, measuring about 2.0 by 2.5 mm in size. Their size indicates that they were produced with a different dentate stamp than that used for the dentate impressions found on the rim of the vessel.

No other decorative elements or designs were found on the A801 pottery sherds. "Crack lace" holes, which are presumed to be functional modifications, occur in three separate instances: on the restored vessel pictured in Plate 1; on one of the rim sherds attributable to the restorable vessel excavated in 1976 and reported by Rowlison (1977:110 and Plate 9); and on one body sherd which is likely from a different vessel entirely. All of the holes were conically drilled from the exterior of the vessel and are fairly homogeneous in size and shape, measuring approximately 8-11 mm in diameter on the exterior surface of the sherd and tapering down to 5 mm on the interior. Locational data could be determined for the holes on the sherds belonging to the two restored vessels. On the rim sherd attributable to the vessel reported by Rowlison, the single extant hole is located on the rim approximately 21.5 mm below the lip, just above the zoned dentate stamping. On the restorable vessel recovered in 1980, six holes, or, more specifically, three sets of paired holes, are present. Two holes were placed 53 mm apart on the rim, approximately 44 mm below the lip of the vessel. Two other holes were placed more or less opposite the first two, on the other side of the vessel, 35 mm below the lip. They are spaced 35 mm apart. At some distance below those two holes are two others which are spaced 49 mm apart. They are located on the body of the vessel, below the shoulder, and are visible in Plate 1. One is 166 mm below the lip, the other 182 mm.

As described in part by Rowlison (1977:110), "crack lace" holes are primarily thought to have been utilized to reinforce or repair a damaged or weak and presumably cracked

section of the vessel wall. Leather thongs or fiber cords were probably used to bind each of the sets of holes, thus holding a cracked but repairable vessel together and lengthening its lifetime of use. As would therefore be expected, cracks are present between each of the paired holes on both of the two restored vessels recovered from 14LT316. This tends to corroborate the inference just presented but there is, of course, no way of knowing whether those particular cracks were present before the vessel was ultimately broken and discarded.

In terms of typological affiliation, the bulk of the pottery recovered from A801 is clearly identifiable as Cuesta ware (Marshall 1972:49-55), a ceramic manifestation of the Early Ceramic Cuesta phase of southeastern Kansas. The exceptions to this are the three grit tempered sherds, which are assumed to represent Havana ware, a Middle Woodland manifestation of the widespread Woodland pottery tradition of the Eastern Woodlands and Prairie/Plains (c.f. Griffin 1952:101-114). More specifically, the sherds appear to represent the Naples Dentate Stamped pottery type (c.f. Griffin 1952:110). Alternately, it is possible that the sherds represent Cooper ware, of the Cooper focus (Bell and Baerreis 1951), which is generally considered to be a northeastern Oklahoma version of the Woodland tradition. The tempering of the three sherds is also reminiscent of Early Ceramic Kansas City Hopewell pottery from the metropolitan Kansas City area of Kansas and Missouri (c.f. Wedel 1943:29-44, 1959:544), but rim form and decorative treatment differ in various essentials. Hence, no definite connections with Kansas City Hopewell groups can be inferred from the evidence at hand.

As mentioned, the ceramic remains from A801 consisted of burned earth as well as pottery. Burned earth was found in abundance, occurring throughout the midden fill in both scattered and clustered context, often in association with concentrations of burned limestone and charcoal which assumedly represent hearth debris. Individual pieces of burned earth, several hundred of the largest pieces of which were collected, range in size from small and nearly intangible flecks up to thumb sized chunks some 30-40 mm in thickness. The collected specimens are fairly uniform, characterizable in general as being amorphously and irregularly shaped lumps with a compact sandy texture and a typically orangish tan coloration. Apparent grass impressions are present on the surfaces of some 26 of the larger pieces, but are somewhat indistinct. Whether the impressions are obscured due to weathering or from a light original impression is uncertain. Judging from the similarity in size,

shape, and color, and the nearly identical context of both the grass impressed pieces and those which were not grass impressed, it is likely that the entire inventory represents hearth debris, i.e., simple burned earth formed by the incidental firing of earth in and around a hearth.

Chipped Stone Artifacts

Diversity and abundance characterized the chipped stone artifact assemblage accrued as a result of the A801 excavations. The inventory consists of 49 projectile points or point fragments, three point preforms, nine knives, 14 drills or drill fragments, two choppers, 26 thin bifaces and 64 crude bifaces, one endscraper, 11 unifaces, one of which is a retouched flake scraper and another an awl or punch, 13 utilized flakes, one hammerstone, 14 cores, and nearly 2,000 pieces of debitage, along with 145 unworked or lightly worked chunks of field chert.

Projectile points: Excavations in the A801 portion of the 14LT316 midden area resulted in the recovery of 34 projectile points and 15 smaller and/or less informative projectile point fragments. The inventory can be differentiated according to several different criteria: by size, with small, medium, and large sized points being present; by stem shape, with both contracting stemmed and expanding stemmed points being observable; and, at a more detailed level of analysis, by typological and/or morphological affinities to established point types. Types discerned in the analysis and/or alluded to in the report include Castroville, Cupp, Edwards, Ellis, Gary, Langtry, Lowe, Manker stemmed, Marcos, Marshall barbed, Motley, Rockwell, Scallorn, Steuben and "micro-Steuben," Trinity, Wells, and Williams. The following discussion deals with the contracting stemmed points first and the expanding stemmed points last, in each case beginning with the smallest points and ending with the largest.

Contracting stemmed points: A total of eight contracting stemmed points was accrued from the A801 excavations. In general, most of the contracting stemmed inventory display rather crude flaking, and several are rather thick for their size. A variety of cherts are represented in the group, three of which appear to be heat treated. Identifiable cherts include one specimen of Peoria and two derived from river rolled cobbles. Morphologically and typologically, the inventory can be divided into two groups: medium sized points with affinities to the Wells point type (c.f. Suhm and Jelks 1962:257; and Bell 1958:100); and medium to large

sized points of the Gary or Langtry types (c.f. Bell 1958:28 and 38, respectively).

Three Wells or Wells-like points were found, the two largest of which are pictured in Figure 15 (A and B). All three are whole. The unpictured smaller specimen is quite similar to Figure 15, A. All three are crudely flaked and relatively thick for their size, with thicknesses ranging from 7.0-8.5 mm and averaging 8 mm. Maximum widths range from 17-20 mm with an average of 19.7 mm, while basal widths range from 8-11 mm and average 9.3 mm. Overall lengths average 44.5 mm with an average of 38.0-45.5 mm. Stems were relatively long, averaging 16.8 mm in length, in each case amounting to about a third to a half of the total length of the artifact.

Four Gary points, with bases that range from markedly convex to nearly straight, are present in the inventory along with one possible Langtry point. On the latter, however, the basal concavity which is a defining characteristic of the Langtry point type may have resulted from breakage rather than intentional modification. The Gary/Langtry points range in size and shape from the largest, the possible Langtry (Figure 15, C) down to the smallest of the more or less complete examples (Figure 15, D). Two points are whole; the others lack tip sections and one is missing most of its blade section. Overall, the five points average 7 mm thick (range of 5-9 mm), 55.6 mm long (range of 46.5 mm to an estimated 77 mm), and 26.6 mm wide (range of 22-32 mm). Stems range in width from 13-20 mm with an average of 16.5 mm. Basal widths, excluding two specimens with markedly convex bases that could not be satisfactorily measured, range from 10-12 mm and average 11 mm. Overall length and width measurements are somewhat skewed by the comparatively atypical size of the largest specimen, Figure 15, C. When that point is excluded from consideration, the remaining four points are of a more uniform size averaging 48.5 mm long and 24.8 mm wide, with the other measurements remaining much the same as those already described.

Expanding stemmed points: A total of 25 points were assignable to the expanding stemmed category, along with seven stem fragments which will be discussed later. The expanding stemmed points account for the bulk of the point inventory and are quite variable in both size and shape.

Small projectile points in the A801 inventory include five specimens readily identifiable as representatives of the Scallorn projectile point type (c.f. Bell 1960:84). Four are made of field chert and one of a coarse textured white chert. Only one (Figure 15, E) is whole and complete,

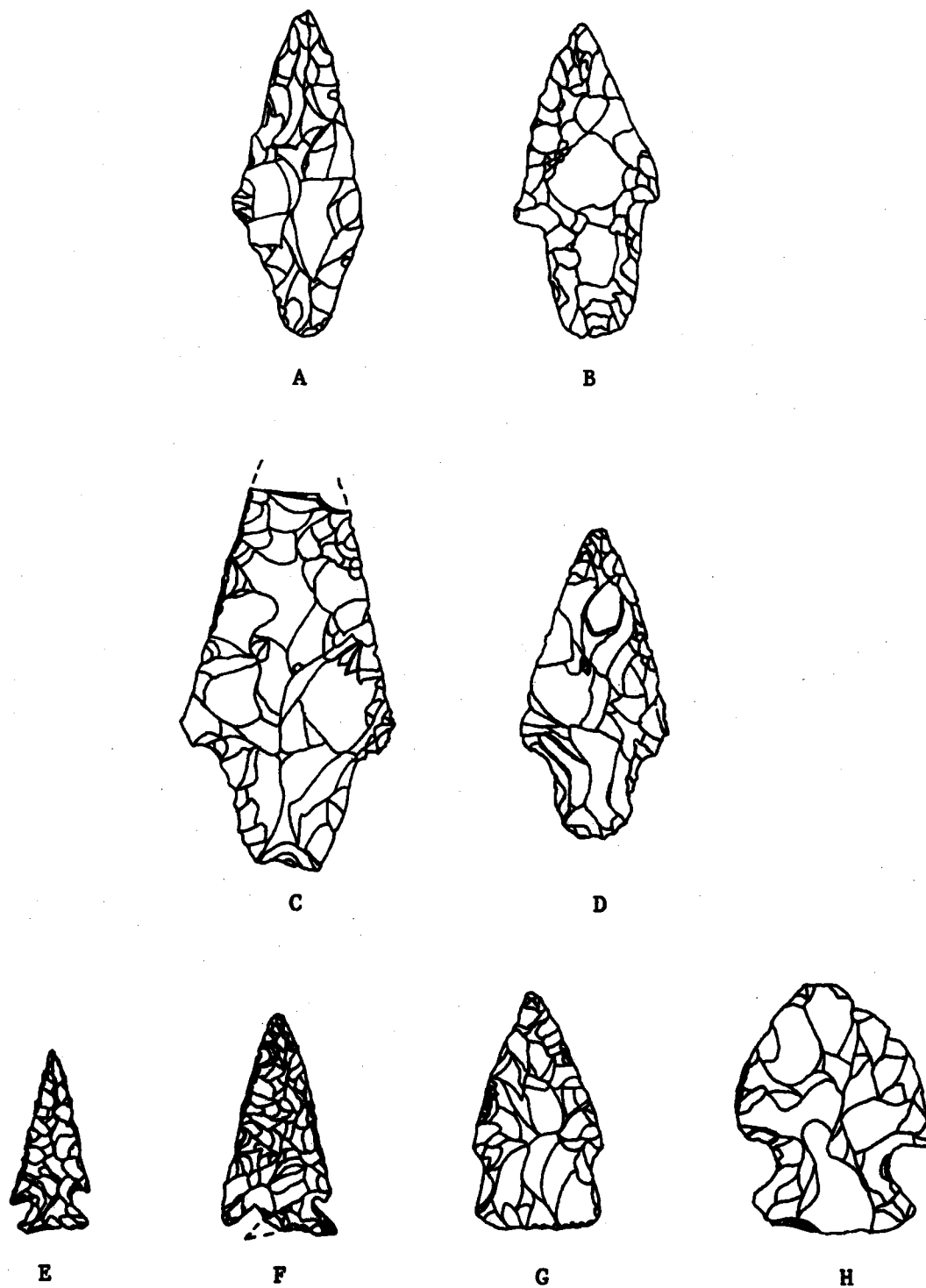


FIGURE 15. Selected projectile points from
A801, 14LT316. Scale is full size.

but most of the others lack only small portions of their stems or tips. One field chert specimen lacks a stem, but is otherwise identifiable, due to its distinctive size and shape, as a Scallorn. The points range in length from 17-27 mm with an average of 22.5 mm. They have an elongatedly triangular shape and are corner notched with expanding stems. Blade widths range from 9.0-12.5 mm and average 10.7 mm. Stems are narrow, ranging in width from 4.5-7.5 mm with an average of 5.7 mm, and are rapidly expanding, with basal widths ranging from 7.0-11.5 mm and averaging 9.5 mm. Bases are straight to very slightly concave. The stems are fairly short, ranging from 5.0-6.5 mm in length with an average of 5.75 mm. The points are rather thick for their size, averaging 4.1 mm with a range of 3.5-5.0 mm.

Two other A801 points are also small in size, and corner notched, but differ in several respects from the Scallorn points just described. Both points have been carefully flaked of heat treated chert and are relatively thin for their size, each measuring 4 mm thick. They have a triangular shape with prominent, downward pointing barbs, and short, rapidly expanding stems with prominent tangs and subconcave bases. Neither are whole; small tang portions of the base have been broken from both. The two points measure 31 and 33.5 mm long, respectively, somewhat longer than the Scallorn points. They are also wider on an overall basis, with blade widths of 19 mm and 17 mm, and stem widths of 7.5 mm and 8 mm, respectively. The longer of the two points is pictured in Figure 15, F. Typological affinities are somewhat uncertain, but the points do bear some resemblance to the Edwards point type (c.f. Perino 1968:20) even though their bases are not nearly as concave as those reported for Edwards points.

Two small to medium sized points have affinities to the Lowe point type described by Perino (1971:60) and the Manker stemmed and "micro-Steuben" types described by Montet-White (1968:73-79). One of the two is missing a very small portion of its tip; the other is whole. The latter, pictured in Figure 15, G, is representative of the two. It is made of a fine textured white chert, probably Peoria. The other is made of a brownish gray banded chert. The two points have triangular blades with fairly straight edges and rounded shoulders, relatively wide, straight sided, moderately expanding stems, and straight bases. Stems were nearly identical in size and shape, each being 10 mm long and having bases measuring 18 mm wide. Stem widths varied by only half a millimeter, being 15.5 and 15 mm wide, respectively. Blade widths, being 19 and 20 mm, also corresponded closely. Blade lengths were more divergent, lending to an overall point length of 35.5 mm on the pic-

tured example and an estimated 43 mm on the other. However, the latter is somewhat crudely flaked and a millimeter thicker (6 mm) than the more carefully worked smaller point, and may have been discarded prior to its completion. It should be noted in passing that the two points were found fairly close together, a little over a half meter apart, in X20, at depths of 57 and 71 cm below surface, respectively.

Five of the A801 point inventory are medium sized specimens categorizable as representative of the Ellis point type (c.f. Bell 1960:32). At least two of the group, however, appear to be little more than lightly worked notched preforms broken during manufacture. In fact, all but one of the group, including the representative example pictured in Figure 15, H, are somewhat crudely flaked and/or asymmetrical in shape. Two are made of a heat treated pinkish white chert, another of grayish white chert, one of brownish gray chert, and one (Figure 15, H) of a heat treated, coarse textured, pinkish gray chert. Three are missing the tip sections of their blades and one other is missing part of its base; only the pictured specimen is whole. As a group, the points have fairly wide, squat, unbarbed blades with distinct shoulders and slightly to moderately convex edges, overlying relatively wide, moderately expanding stems with subconvex bases. The points average 7.6 mm thick with a range of 6-9 mm. Overall length could be measured on one apparently resharpened specimen (Figure 15, H), which is 37.5 mm long. The others are estimated to range from 38-51 mm in length, averaging around 44.3 mm. Blade width measurements range from 24.5-29.5 mm with an average of 27.2 mm. Stem widths range from 17.0-19.6 mm and average 18.2 mm, while basal width measurements produced a range of 21-25 mm with an average of 23.3 mm. Stems are fairly short, ranging from 11-15 mm long and averaging 13.1 mm.

Two A801 points are medium sized specimens whose characteristics do not correspond exactly with those of any of the established point types, although some morphological resemblances to the Rockwell point type (c.f. Perino 1971: 84), and to the Marshall barbed points reported by Montet-White (1968:79 and Figures 31 and 32) are apparent. The points have triangular and relatively straight-edged blades with slight barbs, leading down to straight-sided expanding stems with straight bases. Neither of the two are whole, although one, pictured in Figure 16, A, is missing only a very small portion of its tip. The other is broken into three sections and is lacking part of the midsection and one barb section. The latter is made of heat treated, mottled,

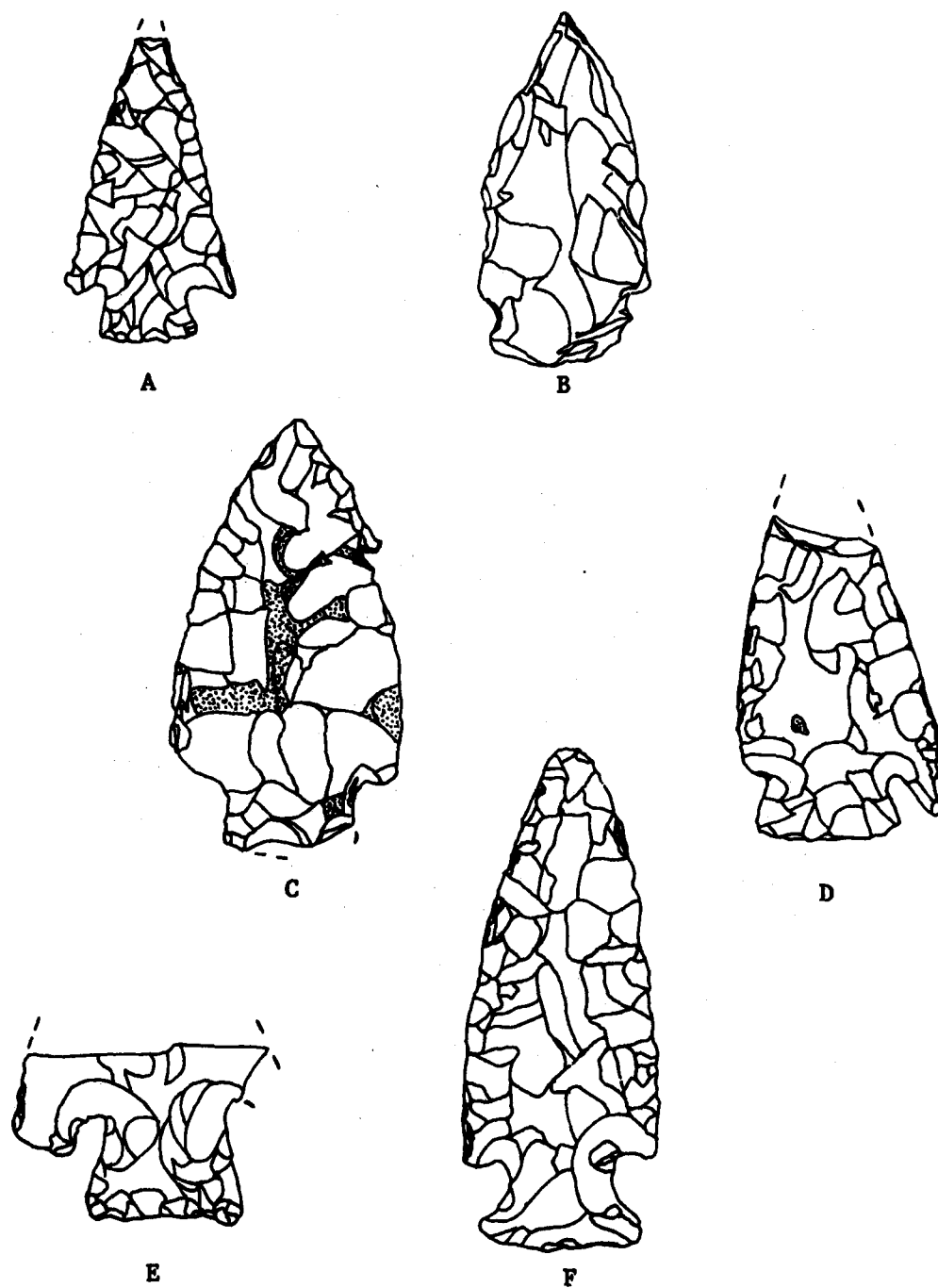


FIGURE 16. Selected projectile points from A801, 14LT316. Scale is full size.

orangish colored chert, probably Florence, and the pictured specimen is made of a dark gray, nearly black chert. The two are relatively thin, around 5 mm in thickness. Overall lengths range from 43 mm on the pictured specimen to an estimated 53 mm on the other. Similarly, blade widths range from 23 mm on the former and an estimated 28 mm on the latter. The stems, unbroken on each, were 11 mm and 16 mm wide and 7 mm and 8 mm long, with basal widths of 13 mm and 20 mm, respectively.

One medium sized point in the A801 inventory bears many of the characteristics of the Trinity point type (c.f. Bell 1958:96). The point (Figure 16, B) has a roughly triangular and nearly lanceolate-shaped blade, ill-defined shoulders, shallow notches entering more from the side than the corner, and a short, more or less rounded, expanding stem. The artifact is 49.5 mm long and has a maximum width of 24 mm, with a stem width of 18 mm and basal width of 20 mm. The stem is 9 mm long. The base does not exhibit the grinding reported for the types, but it is possible that small basal portions of the tangs may have been broken off. Unfortunately, it is difficult to determine whether the extant base is the intended shape and size or the result of breakage, since the point is so crudely chipped. Made of a coarse textured white chert, and relatively thick (9 mm) for its size, the characteristics of the point are quite in accord with Bell's remarks that the type "...is relatively crude in workmanship and is apt to be heavy and thick in cross-section" (1958:96).

One medium to large sized projectile point (Figure 16, C) in the A801 inventory is missing a tang and much of the basal portion of its stem, but is identifiable as having many of the characteristics of the Steuben and Lowe point types (c.f. Perino 1971:60, and 1968:94, respectively) as well as those of the Williams point type (c.f. Bell 1960:96), although it diverges from those types in certain respects. Made of light tan colored chert and derived from a river rolled cobble, the artifact has a broad triangular-shaped blade with subconvex edges and rounded to slightly angular shoulders, leading down to a relatively short, slightly expanding stem. The base was apparently straight to slightly convex in shape. The artifact is 9.5 mm thick and 61 mm long, and has a maximum width of 33 mm. The stem is 10 mm long and 18 mm wide, and expands to a basal width estimated at around 19 mm.

One A801 projectile point (Figure 16, D) can be assigned to the Marcos point type although the artifact was resharpened along one edge, probably following the breaking

off of a barb, and may have been used primarily as a knife. Made of tan colored and possibly heat treated chert, the point apparently had a triangular, prominently barbed blade with straight to slightly convex edges, overlying a fairly short expanding stem with straight edges and a slightly convex, nearly straight base. The point is 5 mm wide and was probably around 56 mm long. It is presently 28 mm wide, but with the missing barb it probably measured around 31 mm. The stem is 17 mm wide and expands to a basal width of 20 mm. Stem length is 9 mm.

Two medium to large sized A801 points, one of which is pictured in Figure 16, E, are distinguished by the presence of massive and slightly squared-off barbs. The artifacts are corner notched, almost basally notched, and have moderately expanding stems with subconcave bases. The specimen not pictured has rounded tangs and its base could thus be described as complexly curved. Both points are made of gray chert. Most of their blade sections and one barb have been broken away from each, and the unpictured example has been resharpened along its broken lateral edge. Stems on the two are, respectively, 22 mm and 18.5 mm wide and 15 mm and 16 mm long. Basal widths are 22 mm and 24 mm, respectively. The pictured specimen is 6.5 mm thick, the other is 7 mm thick. Estimated lengths on the two range from 66 mm on the pictured example to 55 mm on the other. Although the lack of a blade makes typological inferences somewhat uncertain, various morphological affinities with the Marcos, Marshall, and Castroville point types (c.f. Bell 1958:42 and 44, and 1960:14, respectively) can be seen.

Four A801 projectile points bear a strong morphological resemblance to the Motley point type described by Bell (1958:62), and the Cupp type described by Perino (1971:20). Figure 16, F, is a representative example of the group and the only whole specimen; the others lack small portions of their bases and one is missing its tip section. As a group, the points are medium to large in size. They are characterized by a fairly long, triangular blade with gently convex edges, shoulders which range from rounded to very slightly barbed, and a narrow-necked expanding stem with bases that range from straight to slightly convex in shape. Only the largest (Figure 16, F) and the smallest of the group could be satisfactorily measured as to length, producing a range of 56-71 mm. Blades range in width from 22-27 mm and average 25.6 mm, while stems range from 12-14 mm and average 13.3 mm. Basal widths, estimated on one point and measured on two others, range from 16-22 mm and average 19.7 mm. Stems were 12 mm long on the three measurable specimens. The points range in thickness from

6-8 mm with an average of 7.25 mm. Two of the group are made of a tan chert, and two of different heat treated cherts.

Projectile point fragments: In addition to the more or less complete and/or typologically identifiable projectile points just discussed, 15 projectile point fragments of a less identifiable nature were found. The fragments include five notched blade sections, one notched midsection and one edge of a notched midsection, and eight stem sections. A variety of cherts are represented, about half of which appear to have been heat treated. Several different kinds of points are represented in the group. The notched midsection, for example, is part of a very small point, almost certainly a Scallorn point. Made of heat treated pinkish white chert, the fragment is 3 mm thick with a blade width of 9.5 mm and stem width of 4.5 mm.

All of the other point fragments were derived from medium sized, notched projectile points. Of the eight stem sections, all but one have expanding stems. The single exception has a contracting stem with a convex base and is probably part of a Gary projectile point. All the other stem fragments are unidentifiable as to specific point types and are somewhat variable in terms of their morphological characteristics. Basal widths in the group range from 18.0-26.5 mm. Most of the stems have concave lateral edges, tangs that vary from angular to rounded, and bases that range from straight to subconvex. One has a slightly concave base.

The five blade sections and one midsection edge remaining to be discussed are somewhat more informative. One of the group, made of Foraker chert and crudely chipped, is contracting stemmed and probably represents the remains of a Gary or Langtry point. Another, a barbed blade section crudely chipped of heat treated, coarse textured, pinkish gray chert, is thick, broad, and short, and is probably a representative of the Ellis point type. Measuring 8 mm thick with a blade length of 36 mm, blade width of 35 mm, and stem width of 20 mm, the specimen is quite similar in many ways to the largest of the A801 Ellis point inventory, pictured in Figure 15, H. The other blade sections are neither as large nor as broad as the specimen just described. Thicknesses range from 6.5-7.0 mm, blade lengths from 31-35 mm, and blade widths from 21-26 mm. All are shouldered rather than barbed, except for the one midsection edge, which has a distinct but not remarkably long barb. Narrow-necked stems, with widths of 11 mm and 13 mm, are evident on two of the blade sections. Several different

point types may be represented, but no typological ascriptions could be made due to the absence of complete stems and bases.

Projectile point preforms: Three thick, triangular-shaped, and relatively crudely worked bifaces from A801 were classified as projectile point preforms. One is made of a white chert, possibly Peoria; the other two are made of field chert. One field chert specimen, missing its tip section, is 5 mm thick and has a maximum (basal) width of 24 mm. It is angular in shape and is estimated to have had a length of around 43 mm. The other two preforms are smaller, with lengths of 27 mm and 35 mm, widths of 14 mm and 17 mm, and thicknesses of 6 mm and 7 mm, respectively. Both have rounded, subconvex-shaped bases and may be preforms for Scallorn points.

Knives: A total of nine knives was recovered from the A801 excavations. A variety of cherts are represented, including one specimen of Florence, one of Peoria, and one of black chert. The Florence and Peoria examples and three others have been heat treated. However, thermal alteration of the Peoria specimen may have been unintentional, since it exhibits "pot lids," a characteristic of rapid and uncontrolled heating.

Morphologically, the inventory can be differentiated into four groups: stemmed knives (four examples); alternately beveled knives (three); straight knives (one), and ovately triangular knives (one). The four stemmed knives are all rather large, and judging from their size and shape may in fact be spear points. Unfortunately, the stems are missing from all four specimens, and on one, most of the side of the blade is missing as well. Three of the four, exemplified by Figure 17, A and B, have more or less triangular blades with straight to slightly convex edges. The other (see Figure 17, C) has a lanceolate-shaped blade. Blade lengths on the four range from 68-79 mm with an average of 73.8 mm. Maximum blade widths on the three measurable specimens range from the 27.5 mm exhibited by Figure 17, C, up to the maximum of 44 mm seen on Figure 17, B, but average 33.8 mm. Thicknesses range from 7-10 mm and average 8.25 mm.

The beveled knife inventory includes one unbroken, triangular-shaped example made of black chert (see Figure 17, D), and two others from which one end of the artifact has broken off. Both of the latter are pointed on their extant ends, and one (Figure 17, E) may have been diamond shaped when whole. The unbroken knife is 9 mm thick, 25 mm wide at the base, and 60 mm long. The other two are 8 mm

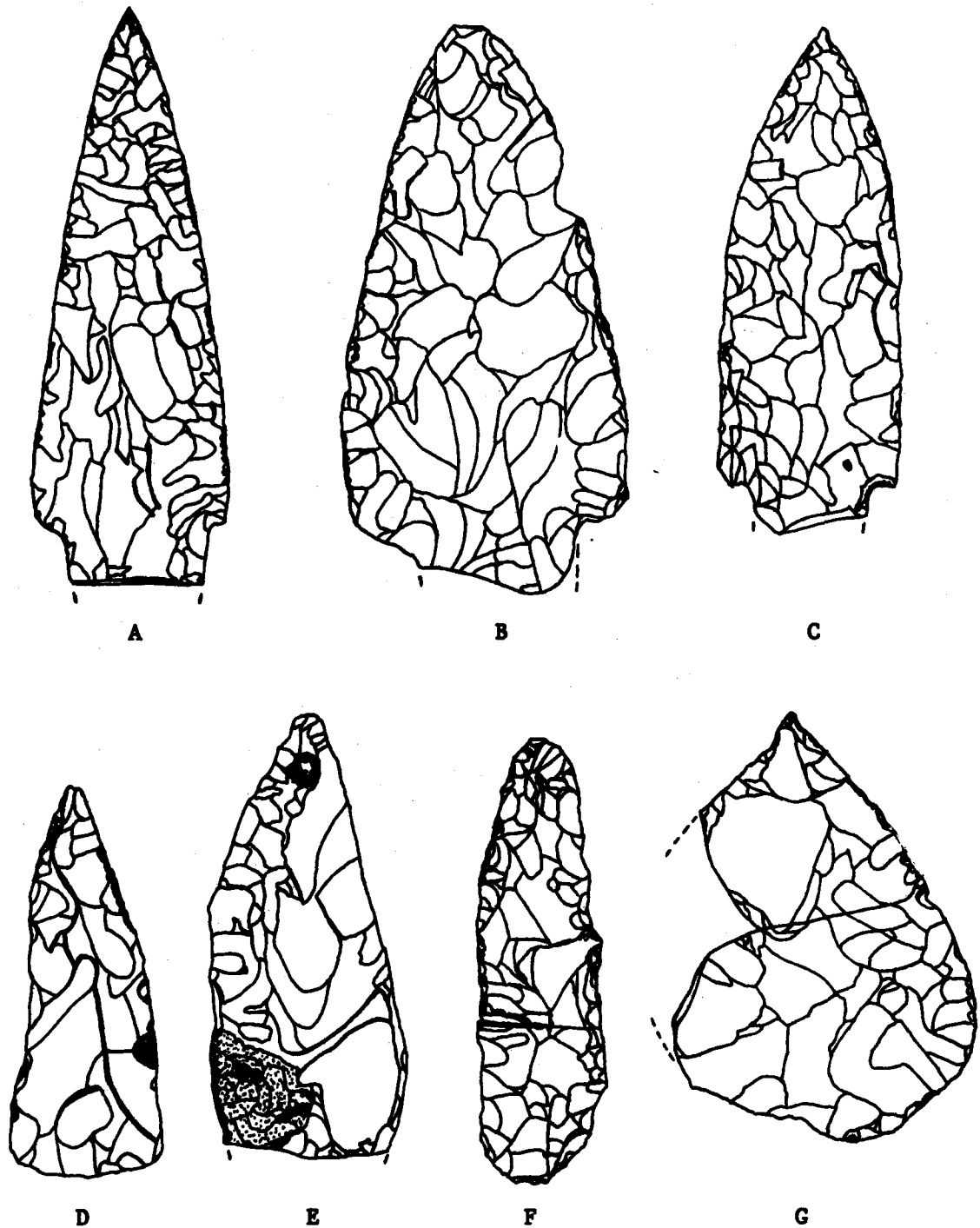


FIGURE 17. Selected knives from A801,
14LT316. Scale is full size.

and 10 mm thick, and 36 mm and 31 mm wide, respectively. In passing, it is worth noting further that the black chert specimen (Figure 17, D) is somewhat "twisted" in longitudinal cross-section, much like, for example, Pandale points as described by Bell (1958:70). However, judging from the fact that similarly "twisted" tools and flakes of the same material are present in the collections resulting from the 1973 investigation of the site, it is inferred that the twisted shape derives from the natural fracturing qualities of the stone itself rather than from a cultural decision to produce such shapes.

The other two knives, the straight and the ovately triangular specimen, are also pictured in Figure 17 (F and G, respectively). The straight knife is little more than a pointed biface, 8 mm thick, 20 mm wide, and 68 mm long, crudely flaked of grayish white chert. The ovately triangular specimen, from which a large lateral section has been broken off, is sharply pointed on one end, and beveled near the tip. Made of heat treated Florence chert, the artifact is 8 mm thick and 64 mm long, and probably measured around 50 mm wide. It is possible that the specimen is a large ovate projectile point preform rather than a knife, but it should be noted that the artifact is much larger than any of the projectile points recovered from the site.

Drills: Fourteen drills were recovered from A801. Three are complete (one is broken) and five are lacking portions of their tips or distal ends. The other six are tip sections. At least three of the group had been heavily used prior to discarding, as evidenced by a pronounced dulling of their distal ends. A variety of cherts are represented in the inventory, including one specimen of field chert and one of black chert. Only one of the drills appears to have been heat treated, and on that one, which is broken in half, only the proximal half had been thermally altered.

Morphologically, the inventory can be differentiated into three distinct groups: T-shaped, or winged, drills; "straight" or pin-shaped drills with bulbous or broadened proximal ends; and reworked projectile point drills. Two T-shaped examples are discernible, one of which is pictured in Figure 18, A. Basal widths on the two drills are identical, 21 mm. Two pin-shaped drills were found, the thicker and more crudely flaked but most complete of which is also pictured in Figure 18, B. The pictured specimen has a maximum width of 24 mm and thickness of 15 mm; the other drill is smaller and measures 14 mm wide and 8 mm thick. Four reworked point drills are observable in the inventory, one of which is pictured in Figure 18, C. As can be seen,

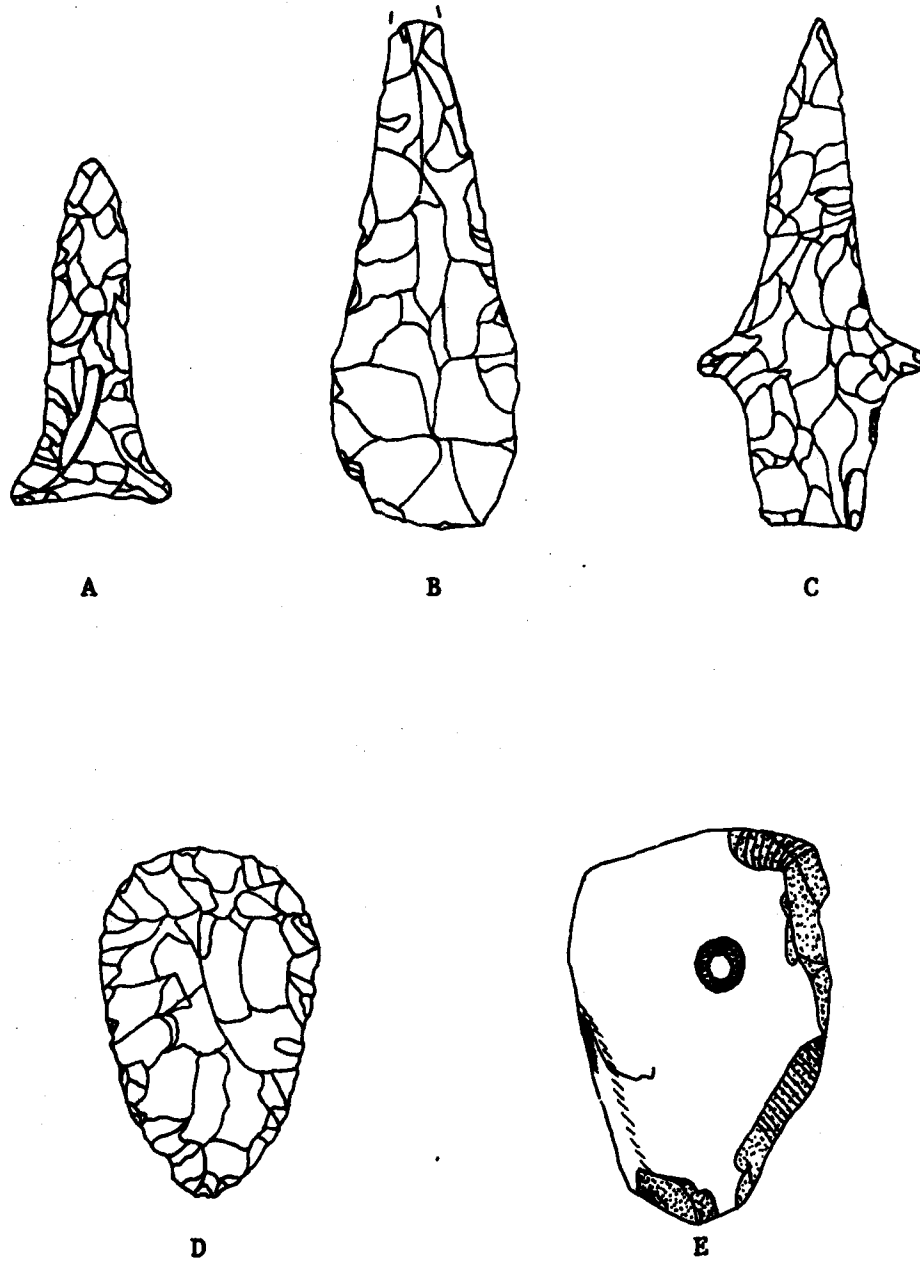


FIGURE 18. Selected drills, an endscraper, and a slate pendant from A801, 14LT316. Scale is full size.

the pictured specimen has a contracting stem with a subcon-cave base, and is apparently a reworked representative of the Langtry point type (c.f. Bell 1958:38), as is one other of the group which is somewhat smaller. The maximum stem width on the pictured artifact is about 19 mm; the basal width is 13 mm. Stem width on the smaller Langtry is 17 mm; basal width is 12 mm. The other two reworked point drills are crudely flaked and somewhat thick for their size. One is contracting stemmed and hence similar to the two just discussed, but the basal part of the stem is missing and could not be examined. The artifact, probably a reworked representative of the Wells point type (c.f. Suhm and Jelks 1962:257), has a maximum stem width of 19 mm. The remaining drill to be discussed exhibits a slightly expanding stem with a basal width of 18 mm and a stem width of 16 mm, and has a straight to slightly convex base.

The three complete examples in the drill inventory range in length from the 45.5 mm observable on the one complete T-shaped drill (Figure 18, A) up to the 68 mm exhibited by one of the two complete reworked point drills (Figure 18, B). The other complete reworked point specimen is 54 mm long. Neither of the two pin-shaped drills are whole, but the one pictured in Figure 18 measures 69 mm long and is missing only a very small portion of its tip. The other such drill, however, appears to have been somewhat longer.

The bits of the drills vary in cross-section, not only throughout the inventory but in individual instances, from being lozenge shaped to diamond shaped. Midsection widths range from 8-15 mm and average 11.1 mm, while thicknesses measured at the same location range from 4.5-8.5 mm with an average of 6.5 mm.

Choppers: Two large bifacially chipped stone artifacts from A801 were categorized as choppers. The smaller of the two was made from a weathered, tan colored, tabular-shaped chert cobble. Its edges were bifacially worked by rough percussion flaking, with cortex remaining on portions of both faces. The artifact is oval shaped and measures 77 mm long, 63 mm wide, and 21 mm thick. The other chopper was produced from a river rolled chert cobble with brown cortex and white interior. Several large flakes were removed and one long edge of the artifact was then crudely worked with a minimal amount of flaking. Portions of the bifacial edge are heavily battered. The artifact is somewhat wedge shaped and is 110 mm long, 70 mm wide, and 39 mm thick.

Bifaces: A large number of chipped stone artifacts from A801 were best categorized as bifaces, although the regular flaking patterns and symmetrical shape of several indicate that they are quite likely portions of projectile points, knives, or other bifacial tools. In the absence of identifying characteristics such as notches or barbs, however, the latter will be described here as bifaces, or more specifically as thin bifaces.

The thin biface category thus includes some 26 specimens, seven of which are heat treated. Three of the heat treated group are made of Florence chert. Other identifiable cherts in the thin biface inventory include Foraker (one specimen) and field chert (four specimens). Nine of the bifaces are relatively well worked, symmetrically shaped, triangularly pointed pieces which appear to be tip sections of projectile points or knives. Most are from medium sized specimens, but one small, thin, elongated example, made of heat treated chert and measuring 2.5 mm thick, 8 mm wide, and 17 mm long, is almost certainly from a small sized point, likely a Scallorn. Other possible projectile point or knife fragments include two midsections and one edge section of a midsection. These too appear to be from medium sized artifacts. Two possible basal stem fragments were recovered as well, but they are of an equivocal nature and are uninformative as to the type of artifact from which they were derived. One other the thin biface group appears to be the base of a pin-shaped drill such as were described earlier. The fragment is 7.5 mm thick and is markedly convex or rounded in shape, except along its broken edge, with a maximum width of 21 mm. The remainder of the thin biface category consists of 11 amorously pointed and generally crudely flaked bifaces. They are more or less intermediate in size and some may be from point preforms. Several appear to be nothing more than simple test pieces, while some of the others may be short-term, ad hoc cutting tools.

In addition to the thin bifaces, some 64 crude bifaces of various shapes and sizes were found at A801. As the name implies, these were very crudely flaked and relatively unshaped pieces which are not recognizable as portions of broken tools. These can be divided very generally by size into a small and large category, with the small group containing 40 specimens and the larger group 24, but in actuality the crude bifaces form a continuum from about thumb size on up to the largest, which is around 65 mm long, 50 mm wide, and 25 mm thick. Various cherts are present in the group, about a third of which appears to have been heat treated. Identifiable cherts include one specimen of

Peoria, one of Florence, 26 of field chert, and seven of river rolled chert. At least five of the seven river rolled specimens and six of the 26 field chert specimens appear to have been heat treated. It should be added that the one Peoria biface is a flat, circular-shaped specimen which is predominantly unifacially flaked, possibly indicating use or intended use as an endscraper. In general, however, most of the crude bifaces are probably either test pieces or short-term, ad hoc cutting tools.

Endscrapers: One endscraper (Figure 18, D) was recovered from A801. The snubnosed, ovately triangular endscraper is 46 mm long, 29 mm wide, and 10.5 mm thick. It is relatively high domed, and is bifacially chipped in such a way as to make it convexo-convex in longitudinal cross-section. The artifact is made of a heat treated, mottled, orangish chert, probably Florence, the same chert as was used to make one of the Edwards points previously discussed.

Unifaces: Eleven artifacts from the A801 excavations were classified as unifaces, a descriptive category that ranges from small, lightly retouched but carefully shaped flakes up to large, crudely flaked pieces some of which are likely little more than randomly worked test pieces. The two most obviously shaped unifaces in the group are classifiable as a retouched flake scraper and an awl or punch, respectively. The former consists of the distal end or bit section of the artifact. Made of heat treated, pinkish colored Florence chert, the specimen exhibits steep unifacial flaking along all but its broken edge. It is 3 mm thick and 19 mm wide, and is flat rather than keeled. The other specimen, interpreted as an awl or punch, appears to have been made from a fortuitously shaped, elongatedly triangular flake of field chert. The specimen is 34 mm long and has a maximum width of 15 mm. It has been unifacially worked at its narrow end to produce a sharp, pointed tip. Cortex covers most of the dorsal face of the flake.

Two of the unifaces, one made of Peoria and the other of field chert, appear to be test pieces, although it is possible that both were used as scrapers. The Peoria specimen is a fragment of a larger piece, possibly an endscraper. The field chert specimen, on the other hand, is nothing more than an angular piece of field chert which has been retouched along one long, concave edge.

The rest of the uniface inventory consists of seven thick, angular chunks of field chert which exhibit rough textured, unmodified limestone cortex on one end and steep unifacial flaking on the other end. The worked ends are

roughly convex in shape. The unworked faces of the artifacts range from flat to slightly concave. The overall impression is that of large, crude, minimally worked end-scrapers, perhaps hand held due to the obvious difficulty in hafting or socketing their thick, angular, cortex covered proximal ends.

Utilized flakes: Thirteen utilized but otherwise apparently unworked flakes were recovered from A801. All have at least one edge exhibiting a minimal amount of utilization wear, usually unifacial. Two specimens were used along fortuitously fan-shaped edges while the others were apparently used in a random manner. The inventory consists of a variety of cherts, eight of which appear to have been heat treated. Identifiable cherts include two specimens of field chert, two of Peoria, and one of river rolled chert.

Hammerstones: One hammerstone was found at A801. The specimen is a fairly small, angular, river rolled or otherwise heavily weathered piece of field chert. A caramel colored patina or cortex covers most of the artifact, which has been heavily battered on the more protruding of its edges.

Cores: Fourteen chipped stone cores were found at A801, along with some 145 chunks of field chert which qualify as incipient cores since one or two flakes were struck off them before they were discarded. All of the latter are largely covered with cortex; few appear to have been heat treated.

The fourteen recognizable cores include nine well-used field chert specimens, along with one core of the black chert noted earlier as having been used for one of the A801 knives (Figure 17, D) and several other artifacts. The other cores are of "other" chert types and include one of a heat treated, coarse textured chert, one of a tan chert, one of a bluish white chert, and one of a fossiliferous dark gray chert. All the cores are irregularly shaped, and only the field chert specimens have been worked in such a way as to produce bifacial edges.

Debitage: A total of 1,915 pieces of chipped stone debitage, including 1,433 waste flakes and 482 pieces of shatter, was recovered from A801. In terms of decortication, the inventory consists of 33 primary, 402 secondary, and 998 blank decortication waste flakes, and 54 primary, 180 secondary, and 248 blank pieces of shatter.

All of the debitage is made of chert, with several different kinds of chert being represented. Field chert

comprises the bulk of the material, accounting for about 62 percent of the total. Some 19 small, unworked pieces of field chert, mostly cortex covered, were also found, probably shatter derived from the initial flaking of field chert cores. Florence chert makes up 4.0 percent of the debitage, Peoria chert 3.0 percent, and the "other" chert category some 28 percent. The use of river rolled chert cobbles was evidenced by 54 pieces of debitage, or 3.0 percent of the total. Three pieces of Foraker chert were also found, along with 15 pieces of black chert.

In terms of heat treatment, much of the A801 debitage appears to have been heat treated, although it should be noted that heat treatment is somewhat difficult to determine on the field chert. Three-quarters of the Florence, all of the Peoria, 66 percent of the river rolled chert, 46 percent of the "other" chert category, and probably half of the field chert appears to have been heat treated.

Ground Stone Artifacts

The ground stone artifact assemblage accrued as a result of the A801 investigation is made up of three kinds of stone: slate, sandstone, and hematite or limonite. In functional terms a pendant, a celt, several chopper-like flaked and/or ground artifacts, and grinding slabs are present, along with a few small and less informative pieces.

The pendant (Figure 18, E) is a flat, biconically drilled artifact made of slate. It is 7 mm thick, and has an angular, but generally ovoid shape, with a maximum length of 52 mm and a width of 34 mm. Grinding was somewhat minimal, serving mainly to flatten the two faces somewhat further and to smooth the sharper and more exposed edges. No polishing is observable. On biconically drilled hole is present, located more or less in the middle of the widest part of the artifact. The hole has a maximum diameter of 6 mm and a minimum diameter of 4 mm.

The single celt in the inventory is made of a hard, nearly black colored piece of hematite. It is pointed on one end and has a tear drop shape. The artifact exhibits crude bifacial flaking along almost all its edges and has been ground to a variable extent on both faces and some of its edges. The wide bit end has been ground smooth on both faces but not polished; flake scars, if once present, have since been obliterated by the grinding, which created a fairly sharp, straight edge and a symmetrically rounded shape. Overall, however, the piece appears to be somewhat

crudely executed, perhaps indicating an intermediate, unfinished stage of production.

Most of the A801 hematite/limonite assemblage consists of unworked small sized fragments derived from larger cobbles or slabs. Around 200 such fragments were found, some of which apparently represent debitage derived from the flaking or breaking of larger cobbles. The remaining part of the inventory includes four chopper-like pieces, one bifacially flaked cobble, one unifacially flaked slab, and nine small pieces which have been ground on one face. None of the latter have been shaped to any recognizable degree and they are assumed to have been used as a source of powdered hematite for use in pigment or paint.

Of the flaked pieces, neither the uniface nor the single biface represent recognizable tool forms. The four chopper-like pieces include two hand sized slabs 20-30 cm in thickness and two fist sized cobbles. One of the latter has been lightly ground in places but does not appear to have been otherwise altered. The other cobble and the two slabs have been bifacially flaked along the longer of their edges and could have functioned as choppers. Grinding striations are not observable on those three specimens.

Apparently the only other type of stone used for ground stone industry was sandstone, but the evidence for its use is minimal indeed. Around a hundred small pieces of unburned sandstone were collected during the A801 excavations, but only one piece appears to have been worked. The latter is apparently a section of a broken grinding slab or muller. All of the sandstone is tan or reddish tan colored and is assumedly of local origin.

Faunal Remains

A relatively large amount of faunal material was found as a result of the A801 excavations at 14LT316. Analysis revealed most of the material to be the remains of game animals hunted or trapped by the site's inhabitants, and the remainder to be the remains of small animals incidental to or unconnected with the occupation of the site. The material consists mainly of broken or crushed bone and a small number of teeth and tooth fragments. Very few whole bones were found. Approximately a third to a half of the bone is charred or calcined as a result of burning.

Laboratory analysis revealed that some of the A801 bone could be positively identified in terms of the type of bone and the animal genera and species represented. The game

animals identifiable by means of these positive identifications include deer, rabbit, beaver, and turtle, with deer constituting the bulk of those remains. Nongame animals represented by positively identified bone include mole and fish.

Less positive identifications were made for another group of bone which could be identified only on an equivocal or tentative basis due to a lack of a sufficient number of diagnostic features. A large amount of bone was thus identified in an equivocal fashion as being derived from either deer or antelope and one vertebra was identified as snake or lizard. Tentative identifications were made for a comparatively smaller amount of bone. Opossum, rabbit, and a mouse, and possibly bison or elk, may be represented by that material. Another group of bone fragments could be identified only in a less positive and more generalized fashion as being derived from small, medium, or large sized mammals. And, as is often the case with crushed or burned bone, a large number of bone fragments could not be even tentatively identified due to an absence of any diagnostic features.

Table 1 lists the kinds and amounts of identifiable deer remains recovered from A801. In terms of provenience, the material was scattered throughout the midden area, indicating that deer were hunted on a general and continuing basis. The inventory consists largely of leg bones of one type or another, with at least several different individuals being represented. One of the metatarsals appears to be from a young animal, but there is no other evidence to indicate selection of young animals over old ones. Seasonality was unfortunately not inferable from the bone.

Table 1 also presents an inventory of the artiodactyl bone which was not positively identifiable as deer but which could be identified in a more generalized way as being derived from either deer or antelope. Most of the bone is deer sized, slightly larger than the average antelope. Since no definitely identifiable antelope bone was found, most if not all of the "deer or antelope" category can be assumed to be deer.

Evidence for the exploitation of other, larger, game animals was both minimal and uncertain. A number of bone fragments lacked definite identifying characteristics but were of a size indicative of large mammals such as bison, elk, or deer. Thus, this material, consisting of 12 cranial fragments, four vertebral fragments, one mandibular fragment, one rib fragment, and 139 long bone fragments, was

TABLE 1. List of identifiable artiodactyl remains recovered from A801, 14LT316

Type of Bone or Bone Fragment	Deer				Deer or Antelope			
	right	left	indet.	total	right	left	indet.	total
antler core	0	0	2	2	0	0	0	0
auditory bulla	0	0	0	0	0	0	6	6
mandible	0	0	0	0	0	0	0	2
axis vertebra	-	-	-	1	-	-	-	0
thoracic vertebra	-	-	-	1	-	-	-	0
lumbar vertebra	-	-	-	1	-	-	-	0
vertebra	-	-	-	0	-	-	-	2
scapula	0	0	0	0	1	3	1	5
ribs	0	0	0	0	0	0	30	30
os coxae pelvis	1	0	0	1	0	0	0	0
humerus	1	1	0	2	0	0	0	0
radius	1	3	0	4	0	1	0	1
ulna	0	2	0	2	1	0	0	1
2nd & 3rd carpals	1	1	0	2	2	2	0	4
4th carpal	0	0	0	0	1	1	0	2
radial carpal	0	1	0	1	0	0	0	0
ulna carpal	0	0	0	0	0	1	0	1
intermediate carpal	0	1	0	1	0	0	0	0
auxiliary carpal	2	0	0	2	0	0	0	0
metacarpal	2	1	1	4	1	1	2	4
femur	1	3	3	7	0	0	0	0
tibia	3	5	0	8	0	1	0	1
malleolus	0	2	0	2	2	0	0	2
astragalus	0	0	0	0	17	12	0	29
calcaneus	0	1	13	14	1	1	0	2
calcaneal tuber	0	1	0	1	1	0	0	1
2nd & 3rd tarsals	0	1	0	1	0	0	0	0
centro-quattral tarsal	5	4	0	9	0	0	0	0
metatarsal	5	7	1	13	0	0	24	0
metapodial	0	0	0	0	0	0	1	1
metapodial condyle	0	0	7	7	0	0	14	14
proximal phalange	0	0	0	0	0	0	20	20
medial phalange	0	0	0	0	0	0	4	4
distal phalange	0	0	0	0	0	0	17	17
phalange	0	0	0	0	0	0	1	1

assigned to a "large mammal" category. Of this material, 12 of the long bone fragments are probably bison or elk, the single rib fragment is probably bison, and one of the cranial fragments, a portion of the auditory bulla, is also probably bison. But since no definitely identifiable bison or elk bone was found during the analysis, it should be emphasized that these identifications are tentative. Given the predominance of clearly identifiable deer remains, it is entirely possible that all the "large mammal" remains are, in fact, deer.

The only other definitely identifiable game remains recovered from A801 are rabbit, beaver, and turtle. One rabbit mandible fragment and one beaver mandible fragment were identifiable due to the teeth still in them. Twenty-three turtle shell fragments, all carapace sections, and one turtle pelvis bone were also identified. In terms of provenience, the turtle bone exhibited a fairly scattered distribution, with no pronounced concentrations of the material being discerned.

Very minimal amounts of bone possibly representative of opossum and rabbit were also found at A801, but due to their general lack of diagnostic features the identification must be regarded as tentative. One mandibular fragment was classifiable as possibly being opossum, and one humerus, one metatarsal bone fragment, and one phalange was classifiable as possibly being rabbit. Similarly, a few pieces of bone were identifiable in an even more general fashion as being from small to medium sized animals. These remains include one mandibular fragment, two vertebral fragments, one humerus, one radius, one ulna, one tibia, three phalanx, and 13 long bone fragments. A few of these bone and bone fragments are approximately beaver sized or dog sized and may be associated with the beaver and canid dentition also found in the A801 excavations.

Very minimal amounts of bone were present in the midden to evidence the demise of small, nongame animals. Three humerus bone fragments were identifiable as mole, two vertebrae as fish, one vertebra as snake or lizard, and one humerus, one femur, and one phalange as mouse or some other kind of small rodent. The fish vertebrae are from an extremely small fish, too small to have been purposely caught and eaten by humans. In addition to these identifications, one small mandibular fragment, one long bone fragment, and two vertebrae were classified in a more generalized way as being from small rodent sized mammals of one kind or another.

The dentition recovered from the A801 excavations consists of 49 teeth and approximately 71 tooth fragments, some still attached to portions of the mandible or maxilla. The material was identifiable as representing the remains of several different animals, including deer, beaver, raccoon, rabbit, rodent, and a dog, wolf, or coyote. The bulk of the dentition was representative of deer, with 12 teeth and 18 tooth fragments being positively identified as deer and four teeth and 37 tooth fragments being identified as probably being deer. One tooth fragment was more equivocally identified as deer or antelope. No definitely or even tentatively identifiable bison or elk teeth were found, and it does not seem likely that any of the tentatively identified deer dentition could actually be bison or elk. If any of the tentatively identified deer teeth are incorrectly identified, it is more likely that they are antelope than bison or elk, judging from their relatively diminutive size.

In addition to the deer dentition, nine teeth and one tooth fragment from A801 were identifiable as beaver, probably the remains of a single individual. Two of the beaver teeth, both molars, are still attached to a portion of the mandible of the animal. Raccoon was represented by three positively identified teeth, with two other teeth being tentatively identified as raccoon. Rabbit was represented by two teeth, both attached to a portion of the mandible of the animal. The family Canidae was represented by one tooth, a molar, which is from a dog, wolf, or coyote. Nine teeth and five tooth fragments were identifiable as being derived from various sizes of rodents, and one tooth fragment was identifiable in a more nonspecific fashion as being from a medium sized mammal. The remaining dentition in the inventory could not be identified either specifically or generally.

In sum, the faunal material from A801, including both the bone and the dentition, is representative of several different game animals and a few small, presumably nongame animals. The latter, constituting a very small portion of the identifiable remains, include mole, fish, snake or lizard, and various rodents. The animals presumably hunted or trapped by the inhabitants of the site and represented by positively identified faunal remains include deer, beaver, raccoon, rabbit, and turtle, with deer bone constituting the bulk of the material. One canid tooth was found, possibly representing the remains of a domestic dog, although the tooth could as well be from a wolf or coyote. Less positive identifications suggest that bison, elk, or antelope, and opossum, may also be represented in the inventory, albeit to a minor degree.

Floral Remains

The floral remains recovered from 14LT316 as a result of the A801 excavations include a small number of seeds and nut fragments and an abundance of wood charcoal. The seeds and nut fragments were not observed during the excavation, but were recovered later by means of the water flotation technique. Charcoal occurred as both large fragments and concentrations and as small flecks, all easily visible to the naked eye. The charcoal is assumed to be the remains of wood used as fuel for fires. Samples were selectively taken from most of the larger charcoal concentrations for use in radiocarbon dating.

The seeds and nut fragments were identified by Dr. Ronald L. McGregor, the Kansas State Biologist. One of the seeds, an uncharred grass seed, is assumed to be recent in age and will therefore not be discussed further. All of the other remains are charred and are assumed to represent flora purposely exploited by the inhabitants of the site. The remains represent three different plant groups: forbs, fruits, and nuts.

The forbs are represented by four seeds tentatively identified as bedstraw (Galium sp.), also known as cleavers. Bedstraw is an early season (spring and summer) seed-bearing plant which thrives on disturbed soil situations in bottom-land locations. Charred bedstraw seeds were also recovered and reported from Archaic cultural context at the well-known Koster site in Illinois. Asch, Ford, and Asch, in addressing the possible prehistoric uses of this plant at that site, point out the following:

There is ethnohistorical evidence for Indian use of the entire plant as diuretic medicine (Smith 1932:386) but no indication that the plant was highly regarded as food. Seeds would be collected incidentally with the greens, but in relatively small numbers. The bristly seed coat would render the whole seed unpalatable, though perhaps not inedible. According to Fernald and Kinsey (1943:342), "European writers are agreed that the seeds of Cleavers make the best substitute for coffee in our northern flora." Galium probably grew at the [Koster] site, and many more seeds would have been introduced accidentally since they stick to clothing and animal fur (Asch, Ford, and Asch 1972:17-18).

Fruits are represented by three charred seeds identified as wild grape (Vitis riparia). One other seed fragment, tentatively identified as wild grape, was also recovered. Wild grape is generally found along the prairie/forest interface, and hence would have been easily obtained within the 14LT316 site catchment area. It is an early season (spring and summer) plant, the fruits of which are useful as food and as a source of dye. The recovery of the three seeds and the single seed fragment can be regarded as somewhat fortuitous, since fruits and berries do not require cooking and were probably often consumed largely at the spot where they were picked. So in contrast to seeds collected in autumn, fruit and berry seeds might be rarely preserved at archeological sites (Asch, Ford, and Asch 1972:15).

Nuts are represented in the A801 inventory by two fragments of hazelnut (Corylus sp.), four fragments of pecan and/or hickory (Carya sp.), and two fragments identified tentatively as walnut (Juglans sp.). All of these nuts are edible without elaborate processing and are quite nutritional, having high fat content and containing highly digestible protein of good quality. The hazelnut season begins in August, earlier than for any other nut, and continues through September. Other nuts become available in September and October. In terms of locational distribution, hazelnut is almost exclusively limited to the upland prairie/forest interface, while pecan trees are generally restricted to flood plain forested areas. Hickory and walnut occur predominantly in the uplands but are also found in bottom-land locations.

Several other charred seed and/or nut fragments were recovered from A801, but all are too small and fragmentary for identification. In sum, the inventory of positively identified floral remains includes wild grape, hazelnut, and pecan and/or hickory. Identifications were also made, but with less certainty, for walnut and bedstraw.

Radiocarbon Dates

As mentioned, charcoal comprised the majority of the floral remains encountered at the site in the 1980 investigation. Selective collecting of the charcoal, almost entirely from charcoal concentrations found in association with burned earth and hearth rock, resulted in the recovery of a number of charcoal samples of various sizes. Three such samples, of more than minimal assay size, were sent to Teledyne Isotopes, Inc., of Westwood, New Jersey, for radiocarbon dating. Unfortunately, all three samples appear

to have been contaminated in some way, since they produced dates of A.D. 1660, 1670, and 1675, respectively. These dates are clearly incongruous with the Early Ceramic time frame indicated by the artifact inventory, and they should therefore be disregarded. The nature of the contamination of the charcoal is uncertain, although leaching is one possibility. Judging from the similarity of the three dates, contamination of the three samples was of a nearly identical nature in each case. This largely precludes the possibility of contamination through improper collecting techniques, since the samples were excavated by three different sets of individuals working in three different areas of the midden on three different days. It seems highly unlikely that the samples would be identically contaminated under such conditions.

Excavations at Area 802

The first step taken during the investigation of A802 consisted of ascertaining the location of the old excavation unit in which Rowlison found post molds in 1976 (1977:101). This was done through the use of field notes and maps produced during the 1976 investigation. A locational grid of 3 m² units was then established, centering on the presumed location of the old test unit, and excavation was begun. Since the end of the field season was drawing near, and since very little material was being produced in the excavations, these units were eventually subsumed into two adjacent 6 m² excavation units in an attempt to hasten the investigation. Excavation unit 30, located on the east, was excavated to a depth of 40 cm below surface. Excavation unit 31, immediately west of X30, was excavated to 30 cm below surface in the west half of the unit and to 35 cm below surface in the east half.

The investigation revealed that the 1976 test pit referred to by Rowlison as X8 was located more or less in the center of the A802 excavation. Once the location and dimensions of the test pit had been determined, no further attempts were made to excavate it and it was thereby left in place.

Despite the finding of a post mold, probably of historic origin, none of the anticipated structural evidence postulated by Rowlison was found. A few subsurface soil stains were encountered but none appeared to be of cultural origin. Likewise, no other evidence of a house floor was discerned, nor was daub found. Due to the disappointing results and the paucity of artifacts, and on the advice of the principal investigator, who supervised much of the A802

investigation, the excavations were terminated in favor of further excavations at A801.

Cultural Features at Area 802

Several soil stains were encountered and investigated during the A802 excavations, but only one proved to be a post mold and it is uncertain as to whether it is historic or prehistoric. The feature was located along the north wall of X30, in the northeastern quadrant of the unit. The orifice of the feature was encountered at the base of the plow zone. It had a diameter of 12.5 mm and was apparently circular or oval in shape. The feature extended downward to a depth of 51 cm below the base of the plow zone, or 72 cm below surface, tapering to a pointed end some 5.5 cm in diameter. The feature "leaned" slightly to the east and had crooked, asymmetrical walls, one side bulging out slightly. The fill consisted of friable dark brown soil which contrasted sharply against the clayey, tan colored subsoil. The fill contained one charcoal fleck but was otherwise unremarkable. A small chert biface fragment was found adjacent to the feature, but not in it or apparently associated with it, at a depth of 59 cm below surface.

The feature was almost certainly a post mold, but it is likely an historic phenomenon rather than prehistoric. This conclusion derives mainly from the fact that the feature extends down from the plow zone. By way of contrast, the orifices of the two post molds reported by Rowilson (1977:101) were encountered at a depth of approximately 35 cm below surface, or some 10-15 cm below the base of the plow zone. While it is obvious that these were prehistoric in age, being separated from the plow zone by undisturbed soil, the same can not be said for the feature discovered in 1980. Unfortunately, the feature fill is uninformative as to the cultural affiliation or age of the feature.

Investigation of the few other soil stains found during the excavation indicated none to be post molds. Likewise, burned and unburned rock were found in scattered context below the plow zone, but no clearcut evidence of a hearth or any other type of cultural feature was forthcoming.

Archeological Materials from Area 802

Archeological materials were not particularly abundant at A802, certainly much less so than was the case at A801. The A802 inventory consists of ceramic and lithic artifacts and a few faunal remains. Some of the remains, especially the pottery and one of the points, are significant in terms

of the light they shed on the cultural affiliation of the inhabitants of that part of the site.

Ceramic Artifacts

Ceramic artifacts deriving from the A802 excavations include 10 pottery sherds and a few pieces of burned earth, none of which appeared to be grass impressed. The burned earth was scattered and of a minimal nature and in no way appeared to constitute evidence of a daub covered structure.

The 10 pottery sherds are all undecorated body sherds, apparently the remains of a single vessel. Five of the sherds were recovered from the plow zone and five from 20-30 cm below surface. They are tempered with indurated clay and have fine surface textures, contorted to compact core textures, and plain interior surfaces. Five of the sherds have cord-roughened exteriors; of the remainder, one is a spall lacking an exterior surface and other four are very eroded specimens which may have originally been cord-roughened. Three of the cord-roughened sherds are identifiable as to the type of cord used in producing the surface treatment. An S-twist cord was used on two of the sherds and a Z-twist cord was used on the other. In all three cases, the cords were approximately medium gauge in size. The nine measurable sherds range from 4.5-14.5 mm in thickness, averaging 8.1 mm thick. These statistics are somewhat skewed, however, due to the presence of one anomalously thick (14.5 mm) sherd. When that sherd is excluded, the inventory has a range of 4.5-9.0 mm with an average of 7.25 mm. Unfortunately, the A802 sherds are uninformative in terms of vessel morphology and possible rim decoration.

The A802 sherds represent 2.0 percent of the ceramic inventory recovered from 14LT316 in 1980, and probably represent the remains of an occupation postdating the Cuesta occupation. Typologically, the sherds can be considered to be representatives of Pomona ware, a manifestation of the Middle Ceramic Pomona focus (c.f. Wilmeth 1970:29-33). Assignment to this ware is based primarily on the sherds' distinctive combination of clay tempering and cord-roughening, but also takes into account as corroborative evidence their isolated provenience in A802, and their association there with a small, side notched projectile point which can be regarded on typological grounds as being representative of a Middle or Late Ceramic occupation.

Chipped Stone Artifacts

The chipped stone inventory from A802 consists of four projectile points, 12 bifaces, three endscrapers, three utilized flakes, three cores, and an assortment of waste flakes and shatter.

Projectile points: One whole point, one nearly whole point, and two point fragments were recovered from A802. The complete point (Figure 19, A) is a small, thin, triangular-shaped, side notched and slightly basally notched specimen which can be typologically identified as a representative of the Harrell projectile point type (c.f. Bell 1958:30). The point was quite crudely flaked and has not been altogether thinned along one basal corner. Made of white colored chert with brownish colored, patinated cortex, the artifact is 16.5 mm long and 14 mm wide. It has a maximum thickness of 2.5 mm, but most of the point is somewhat thinner, ranging from 1.5-2.0 mm in thickness. The specimen was recovered from the plow zone.

The nearly complete projectile point from A802 (Figure 19, B) lacks portions of its distal end and its base. Recovered from a depth of 27 cm below the surface, it is a medium sized, corner notched specimen made of heat treated, relatively fine textured, pinkish white chert. The blade of the artifact is straight along one edge and slightly concave along the other, probably as a result of resharpening. It has a maximum width of 29 mm. The barbs, neither of which are broken off, vary from being fairly prominent and rounded in one case and slight to nonexistent in the other. The stem, estimated to have been around 18.5 mm wide, is slightly expanding with rounded tangs and a subconvex base, part of which has been broken off. The point is relatively thin for its size, with a maximum thickness of 5.5 mm. The original length of the artifact was probably around 60-70 mm. Morphological resemblances to the Palmillas projectile point, as defined by Bell (1960:74) are apparent.

The two other projectile points from A802 are represented by incomplete fragments, both of which were recovered from the plow zone. One of the two fragments consists of most of the stem and a very small portion of the blade of a contracting stemmed point with unpronounced barbs. The artifact (see Figure 19, C) was made of slightly fossiliferous, grayish colored chert. It is 6.5 mm thick and has a maximum stem width of 16 mm, with the stem tapering down to a width of 13 mm where it has been broken near the base. The blade appears to have been around 12 mm wide, but the overall length of the artifact cannot be inferred from the evidence at hand. Typologically, the specimen is probably a

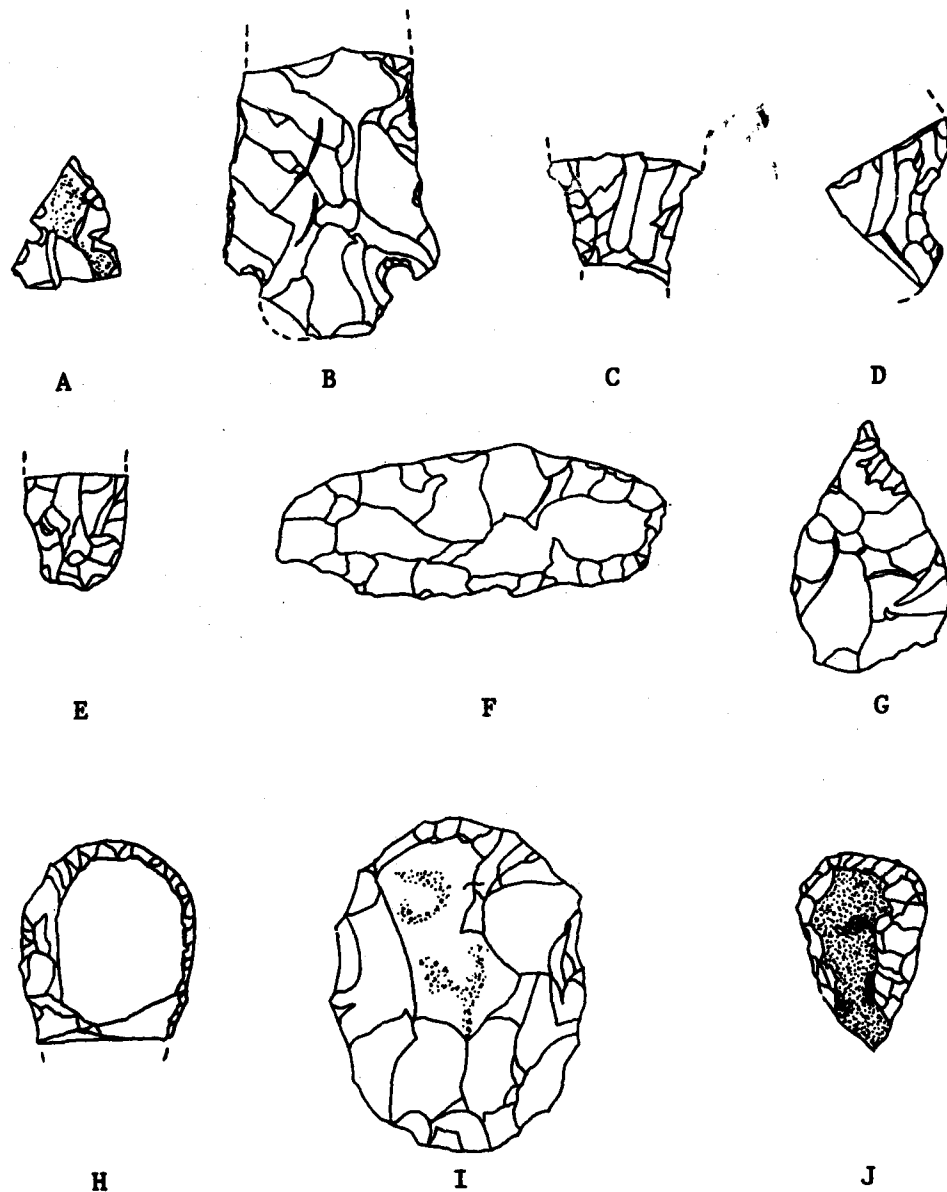


FIGURE 19. Selected chipped stone artifacts from A802, 14LT316. Scale is full size.

representative of the Gary or Langtry projectile point types (c.f. Bell 1958:28 and 38, respectively).

The other identifiable projectile point fragment (Figure 19, D) is somewhat less informative. It consists of a small portion of the stem and blade sections of a medium to large sized, notched point. Both the tang and the barb of the specimen are rounded, but no other morphological conclusions can be drawn. The artifact is 5 mm thick and made of heat treated, pinkish gray Florence chert. Typological affiliation could not be determined due to the minimal nature of the fragment.

Bifaces: Twelve chipped stone artifacts from A802 were classified as bifaces, although several may be fragments of projectile points or knives. One such artifact (Figure 19, E) is probably the stem section of a medium sized, contracting stemmed projectile point. Made of gray chert, it has a maximum thickness of 6 mm and a maximum width of 14 mm. The base is convex. If the specimen is indeed a stem section, it can be regarded as a representative of the Gary projectile point type as defined by Bell (1958:28).

Two other biface fragments are pointed and relatively symmetrical in shape and are likely tip sections of medium to large sized projectile points or knives. One is made of fine textured white chert and is 5.5 mm thick. The other is 5 mm thick and made of fossiliferous bluish gray chert.

One biface (Figure 19, F), which appears to be basically complete and unbroken, is thin and roughly oblong in shape and could perhaps be more specifically identified as a small knife or blade. The artifact measures 52 mm long, 19 mm wide, and 6 mm thick, and is made of field chert. Unifacially modified at one end, the specimen was somewhat crudely bifacially flaked along all its other edges.

One other biface (Figure 19, G), made of heat treated Florence chert, is a small and largely unmodified flake. One end of the flake has been bifacially worked into a fairly sharp and attenuated tip, suggesting that the artifact may have been used or intended for use as an awl or perforator.

The remaining seven A802 bifaces to be discussed are all uninformative fragments of unidentifiable bifacial tools of one kind or another. A variety of cherts are represented in the group.

Endscrapers: Excavations at A802 resulted in the recovery of three unifacially flaked tools identifiable as endscrapers. One was recovered from the plow zone, one from 23 cm below surface in X31, and one from the 30-40 cm level of X30. The plow zone endscraper (Figure 19, H) is a small to medium sized, asymmetrically keeled but more or less flat specimen which has been lightly worked along its edges. The artifact is made of grayish colored chert and has a maximum thickness of 5.5 mm and a maximum width of 23 mm. The proximal or butt end of the specimen has been broken off, hence the original length of the artifact cannot be determined.

The endscraper recovered from X31 is a medium to large sized, oval-shaped specimen (Figure 19, I), made of heat treated, pinkish gray chert. It is relatively thick and high domed, with a maximum thickness of 14 mm. The width of the artifact is 33 mm, the length 44.5 mm.

The other of the three A802 endscrapers is quite small and diminutive in size and is triangular in shape with a snubnosed distal end. The specimen (Figure 19, J) is 25.5 mm long and has a maximum width of 17 mm and a maximum thickness of 6 mm. It is made of heat treated, orangish tan colored chert, probably Florence, and is partially covered on its dorsal surface with an orangish white limestone cortex.

Utilized flakes: A total of three utilized flakes was found as a result of the excavations at A802. All three flakes exhibit wear along at least one of their edges. On two flakes, the utilization wear is unifacial, suggesting that they were used for scraping. On the other of the three, the wear is bifacial, probably the result of using the flake for cutting. The latter was made of a somewhat fine textured gray chert. The other two flakes appear to be made of field chert.

Cores: The excavations at A802 resulted in the recovery of three cores, although more cores of a less clearly recognizable nature may be present in the collection of field chert from the area. One core is a somewhat fine textured gray chert--apparently the same material or core from which one of the utilized flakes was produced. One of the remaining two cores is made of field chert; the other is made of a mottled grayish white chert.

Debitage: A total of 149 pieces of chipped stone debitage, including 105 waste flakes and 44 pieces of shatter, was recovered from A802. In terms of decortication, the

inventory consists of five primary, 31 secondary, and 69 blank decortication waste flakes, and one primary, 18 secondary, and 25 blank pieces of shatter.

All of the debitage is made of chert, with several different kinds of chert being represented. Field chert comprises the largest single group of the material, accounting for a third of the total. Florence chert makes up nearly 23 percent of the debitage, Peoria chert nearly 17 percent, and various other nonidentifiable cherts some 26 percent. The use of river rolled chert cobbles was evidenced by two waste flakes, a little over 1.0 percent of the total. However, it should be noted that some of the blank decortication "other" chert inventory may have been derived from river rolled cobbles.

In terms of heat treatment, much of the A802 debitage appears to have been heat treated, although heat treatment is somewhat difficult to determine on the field chert. Another 88 percent of the Florence chert, 76 percent of the Peoria, all of the "other" chert category, one of the two river rolled chert flakes, and maybe half of the field chert appears to have been heat treated.

Also included in the A802 debitage inventory although not in the above count are 28 chunks of unworked or very lightly worked rock. Field chert accounts for 25 of the 28 specimens, while one river rolled chert cobble, one chunk of Peoria, and one chunk of "other" chert account for the rest. The latter two specimens may be cores, but they are irregular in shape and display little in the way of apparent modification. Likewise, some of the field chert specimens may be lightly worked or briefly tested cores from which one or two flakes were struck.

Ground Stone Artifacts

One ground stone artifact was recovered from A802, from 20-30 cm below surface. Made of reddish brown sandstone, probably of local origin, the artifact appears to be a section of a broken grinding slab. The slab varies in the thickness from 10-20 mm and has been rather minimally ground on both of its faces. One of the faces is flat, the other is dish shaped or slightly concave.

Faunal Remains

In addition to the artifacts, a small number of faunal remains were recovered from the excavations at A802, almost entirely from 20-30 cm below surface in X31. No concentrations

of the material were evident. The inventory includes one tooth and 16 bone fragments. One of the bone fragments is charred as the result of being burned, but none of the other material appears to have been burned. The one tooth is identifiable as beaver, and two of the 16 bone fragments are identifiable as being derived from a large mammal. None of the other bone could be identified due to a lack of diagnostic identifying features.

SUMMARY AND CONCLUSIONS

The 1980 investigation of 14LT316 consisted of excavations in two areas of the site, A801 and A802. The A801 excavations took place in a midden area along the west edge of the site and resulted in the recovery of numerous artifacts, faunal remains, and other archeological materials. The artifacts revealed the midden to be a Cuesta phase manifestation associated with the occupation of a Cuesta house previously excavated in 1973 in another area of the site. The midden apparently resulted from the deposition of household trash and debris in a linear, north-south trending gully or ravine. The midden was around 5-6 m wide and ranged from 50-80 cm in depth. Judging from the excavated portions, including the portions excavated in 1973 which apparently constituted the southern end of the deposit, the midden was at least 40 m or 122 ft long. However, the north end of the midden was not reached in 1980 and its total length and northern extent thus remains undetermined.

One prehistoric cultural feature was encountered, a large post mold located along the western slope of the midden. Its functional purpose was not apparent. Artifacts recovered in the investigation fall into three general categories: pottery, chipped stone, and ground stone. The pottery, which included one restorable vessel, is for the most part readily identifiable as Cuesta ware. A very small number of pottery sherds were identified as representatives of Havana ware, a Middle Woodland manifestation of the Eastern Woodlands. Chipped stone artifacts were quite abundant, although there was a surprising paucity of end-scrapers. Projectile points were by far the most abundant element of the chipped stone tool assemblage, followed by knives and drills. Ground stone artifacts were quite few in number, a slate pendant and a hematite celt being the most remarkable elements of the assemblage. Very little evidence of grinding slabs was found. Faunal remains were abundant and occurred throughout the midden, with deer accounting for the bulk of the material. Beaver, raccoon, rabbit, turtle, and canid remains were also identified, and there was less definite evidence of opossum and bison. Identifiable floral

remains consisted of wild grape, hazelnut, and pecan and/or hickory, and possibly walnut and bedstraw. Charcoal occurred in abundance throughout the midden; unfortunately, the charcoal samples submitted for radiocarbon dating produced unreliable results.

Excavations at A802 in the northeastern corner of the site were much less productive than those at A801, but can be considered worthwhile in that evidence was found to confirm the existence of a second component. The evidence was quite minimal, essentially consisting of a Harrell-like projectile point and a few cord-roughened sherds, but it serves to substantiate earlier suspicions, based on similar ceramic finds reported by local collectors, of an occupation postdating the Cuesta component evidenced in other areas of the site. It is inferred that the A802 remains are a Middle Ceramic, Pomona focus manifestation. The occupation was apparently not intensive or long lived, since relatively few remains were encountered in the investigation. Unfortunately, the buried house floor thought to be present on the basis of the 1976 tests was nowhere found. One post mold was encountered, but it may very well be historic rather than prehistoric. Daub, a major characteristic of Pomona habitation sites, was nowhere present. Other than the culturally diagnostic artifacts already mentioned, very few artifactual remains were found at A802. Three larger projectile points were present to complement the single small, thin, side notched point, a fairly common occurrence in Pomona inventories. The predominance of large points may indicate a fairly early, or transitional, stage of cultural development, but this is not certain. Three endscrapers were found as well, with the remainder of the tool inventory consisting of an awl or perforator and a few assorted bifaces. Ground stone items were restricted to one piece of sandstone, apparently a section of a broken grinding slab. Identifiable faunal remains consist of one beaver tooth.

SUMMARY AND CONCLUSIONS

During the summer of 1980, the Kansas State Historical Society conducted archeological excavations at three sites in the Big Hill lake area of southeastern Kansas. The three sites, 14LT314, 14LT315, and 14LT316, provided information concerning two distinct prehistoric cultural manifestations, the Cuesta phase of the Early Ceramic period and the Pomona focus of the Middle Ceramic. One Cuesta component was investigated, at Area 801 of 14LT316. Two Pomona components were investigated, one at 14LT315 and one at Area 802 of 14LT316. A Middle Ceramic component investigated at 14LT314 is also, probably, Pomona.

The findings of this and any other archeological investigation basically fall into two categories, fact and inference. The artifact assemblages, food remains, and other such data comprise the facts of the matter; from them, inferences can be made concerning the cultural affiliation, maintenance activities, and behavioral practices of the site's former occupants. The facts of the 1980 Big Hill investigation have been presented in previous sections of this report. The following section discusses the inferences which can be drawn from them.

CUESTA PHASE

Excavations at Area 801, 14LT316 were particularly rewarding in that a substantial amount of additional corroborative evidence was gained concerning the artifact assemblage and subsistence practices of a "typical" Big Hill Cuesta group. "Typical," in this instance, is used to emphasize the thoroughly Early Ceramic nature of the remains. None of the A801 material suggests a movement towards, or transition into, the type of lifestyle and material culture employed by Middle Ceramic "Plains Farmer" groups.

All of the pottery, for example, is recognizable as Early Ceramic. The bulk of the midden pottery, including the sherds recovered in 1973 and 1976 as well as those found in 1980, is a homogeneous mix of smooth surfaced, indurated clay tempered specimens derived from conoidal, jar-type vessels decorated along the lip and upper rim exterior by tool impressions and zoned and unzoned dentate stamping. "Crack lacing" was present, indicating once again the Early Ceramic nature of this attribute. In sharp contrast, absolutely no cord-roughened sherds were found in the midden, thus illustrating the utility of this type of

surface treatment in local or areal pottery seriation. The homogeneity of the midden pottery is broken in only one instance, by the presence of three highly decorated, grit tempered sherds which represent a single vessel, assumedly Havana ware. These sherds are important in that they provide evidence of trade or some other sort of contact with "classic" Hopewell or Havana groups of the Eastern Woodlands and, in essence, contact with the "Hopewellian interaction sphere" postulated by Strenver (1964), thus emphasizing the basically Middle Woodland orientation of Cuesta culture.

The projectile points comprise another horizon marker. The points are small, medium, and large in size but are consistently corner notched or stemmed. Stylistically, they are identical to points found elsewhere in Early Ceramic or Middle Woodland context. The rest of the lithic assemblage is of a similar nature; notable in this respect are the reworked projectile point drills, a common occurrence in Woodland context. The slate pendant from the A801 portion of the midden and the sandstone gorget fragment from House 1 also suggest Middle Woodland connections, perhaps religious or ideological in nature, although simple ornamentation could have been the purpose for their manufacture.

Aside from the cultural inferences made possible by the midden material, glimpses into the everyday behavior of the Cuesta inhabitants are also afforded. Hunting was obviously a major concern, judging from the abundance of projectile points and knives as well as the most obvious evidence of all, the bones of the animals themselves. In terms of hunting technology, the small Scallorn points suggest the use of the bow and arrow, while the larger number of medium and large sized points are assumed to evidence the more common use of spearthrowers, or atlatls. However, no boat stones, or atlatl weights, were found in the investigation.

Gathering was also evidently practiced, judging from floral remains consisting of fruits (wild grape) and nuts, specifically hazelnut and pecan and/or hickory. Less definite evidence suggests the use of walnut and bedstraw as well. Gathering of floral resources was probably more important than is indicated by the number and kinds of recovered floral remains, since remains of this sort are not commonly preserved and since archeological recovery is even less likely. In this respect, however, the general absence in the A801 inventory of artifacts associated with food processing, particularly grinding slabs, is somewhat puzzling. It is possible that seed plants were not extensively exploited, although this does not seem likely, or that the seeds were not usually processed by grinding.

However, judging from Rowilson's unpublished analysis of the artifacts from the nearby A731 house floor, where grinding slabs were apparently found, it may be that grinding slabs and mullers had a relatively long lifetime of use and hence were not often thrown away.

In sum, the A801 midden remains indicate a subsistence economy centered on the hunting and gathering of riparian resources. Agriculture is nowhere suggested and if present originally, was probably of minor importance. The extant floral remains indicate the gathering of fruits, nuts, and possibly other wild plants. Faunal remains indicate a reliance on deer and a lesser exploitation of smaller animals such as beaver, raccoon, rabbit, and turtle, and possibly opossum.

Other economic activities which can be inferred from the midden remains include chert procurement, hideworking, and craft work, probably wood working. In terms first of chert procurement, the Cuesta flintknappers were obviously willing to exploit the locally abundant field chert, judging from the proportionately large amount of field chert in the chipped stone inventory, even though it was not the best rock for knapping. At the same time they apparently went to some trouble to get higher quality chert, particularly Florence chert. The Florence was of necessity obtained either through trade with another group or by means of direct procurement from quarries in the Flint Hills at least 60 miles or so to the west of the Big Hill area.

Hideworking is also indicated, but the evidence for it in the A801 inventory is relatively sparse, consisting of one endscraper, one retouched flake scraper, and possibly a few of the unifaces. Given the abundance of deer bone, one might expect a larger and more extensive endscraper inventory. However, Early Ceramic inventories in Kansas typically do not contain an abundance of endscrapers. It is possible that bone or wood tools were used for hideworking, but artifacts of this sort have yet to be recognized. One infers that hideworking was not a major element of Early Ceramic life, and certainly not at 14LT316. One rather speculative inference suggested by this is that hides were not used to cover the lodge, bark or mats or some other kind of material being used instead.

Craft work is obviously inferable from the large number of drills and broken drill fragments, and many of the bifaces, unifaces, and utilized flakes in the inventory may also have been used in various kinds of craft work. The extant evidence indicates the drilling of stone for pendants

and gorgets and the drilling of "crack lace" holes in pottery, but due to the large number of drills and the smaller number of drilled artifacts, it is assumed that craft work largely involved wood or some other similarly perishable medium such as bone.

To conclude, the various investigations of the Cuesta component at 14LT316 provide a picture of a small group of people, probably a dozen individuals of various ages, living in a bottomland riverine environment in a large circular house located on a terrace adjacent to Big Hill creek. Similar groups may have been present nearby. Fortunately for the archeologist, they were apparently somewhat fastidious, cleaning the house probably on a regular basis and dumping the trash and other debris in a nearby gully where it accumulated and was preserved. The group was apparently fairly sedentary, occupying the site over a number of years at the very least, probably with occasional seasonal removes necessitated by flooding. They survived and prospered apparently by means of a hunting/gathering economy centered on riparian resources, with deer being heavily exploited. They may have grown corn, judging from evidence recovered at one other Big Hill Cuesta site. Culturally, they had a Middle Woodland orientation and were probably associated to some degree with similar groups located further east.

POMONA FOCUS

The 1980 Big Hill investigation recovered evidence of Pomona occupation at 14LT315 and Area 802, 14LT316. A similarly Middle Ceramic component investigated at 14LT314 is probably also Pomona and will be assumed to be so for the purposes of this discussion. The resultant data is informative in terms of the settlement pattern, artifact assemblage, subsistence practices, and cultural identity of the Big Hill Pomona groups. Unfortunately, no information was gained concerning Pomona habitational structures, a major objective of the excavations.

The cultural affiliation of the sites' inhabitants can now be regarded as established rather than tentatively identified--they were members of the widespread Pomona focus of eastern Kansas. However, it should be noted that this conclusion is strictly an inference drawn from the ceramic and lithic artifacts as well as the general location of the sites, since no radiocarbon dates or other corroborative data are available. The indurated clay tempered, cord-roughened pottery recovered from 14LT315 and A802, 14LT316, for example, has all the characteristics of Pomona ware. The culturally diagnostic lithic artifacts likewise have an

emphatically Middle Ceramic character due to the predominance of small, thin, triangular, side and/or basally notched points. And as is common in Pomona lithic assemblages, larger corner notched and stemmed points are also present. At 14LT315, the most substantially represented of the sites investigated, the large points are greatly outnumbered by the small points, and it is well to remember that other small points of similar character were reportedly removed from the site by private collectors prior to the Society's investigations as they were at 14LT314. At A802, 14LT316, the situation is somewhat reversed, with large points, albeit few in number, overshadowing the single small Harrell-like point. Since most if not all of this component has been disturbed by cultivation and subjected to the depredations of private collectors, the exact original nature and proportional differentiation of the projectile point assemblage cannot be known, but the crudity of the small point and the predominance of larger points suggests a rather early stage of technological and cultural development. At 14LT314, a similarly Pomona-like mixture of Early Ceramic and Middle Ceramic artifact types was present. The small, thin, side notched points reported by private collectors are clearly Middle Ceramic, while the oppositely beveled knife fragment found in 1976 and the Scallorn-like projectile point and possible contracting stemmed point fragment recovered in 1980 represent types that could be found in either Early Ceramic or Middle Ceramic context.

Aside from the cultural inferences just mentioned, the artifacts from the sites are also indicative of Pomona subsistence practices. In fact, they provide almost the only data relating to subsistence practices, since no floral remains and only a very few faunal remains were found. The latter consists of a few pieces of bone and teeth, including one beaver tooth from A802, 14LT316 and turtle (Rowlison 1977:98), deer, elk, and/or bison remains from 14LT315. The extant faunal remains and the large number of projectile points at the sites clearly indicate the hunting of large and small game, but little else can be said about the economic importance of hunting. Likewise, the gathering and processing of seed plants and/or other floral resources is suggested by the presence of a couple of grinding slab fragments at 14LT315 and A802, 14LT316, and a muller section at 14LT315, but the evidence is only minimally informative.

The artifact assemblages are also informative as to chert procurement and certain behavioral or maintenance practices, namely hideworking and craft work. In terms of chert procurement, the evidence indicates that the Pomona, like the Cuesta peoples before them, did not hesitate to

exploit the locally abundant but relatively low quality field chert. Similarly, they apparently went to some trouble, by means of either trade or direct procurement, to obtain higher quality chert from outside the immediate area, particularly Florence chert from the Flint Hills.

Hideworking is indicated by the endscrapers found at 14LT315 and A802, 14LT316. The possible awl or perforator found at the latter manifestation may also have been used in hideworking. The three endscrapers at A802, 14LT316 formed a proportionately large part of that component's rather small chipped stone assemblage; at 14LT315, however, which yielded a much larger inventory, only two endscrapers were found. Even so, it is notable that there were more endscrapers found as part of these excavations than were found in the entire A801, 14LT316 midden excavation, suggesting that hideworking was a more important element of Pomona life than of Cuesta.

In a reverse but like manner, craft work was heavily represented in the Cuesta component at 14LT316 by an assortment of drilled artifacts and numerous drills and drill fragments, while no drilled artifacts and only one drill (or possibly a perforator) was present at 14LT315 and none at either 14LT314 or A802, 14LT316. One assumes that there was little or no call for drilling during the occupations represented by the three Middle Ceramic components. Similarly, only a small number of bifaces were present in their inventories, and many of those, especially at 14LT315, were fragments of broken projectile points. All in all, craft work appears to have been minimal or lacking during the three Middle Ceramic occupations.

In terms of settlement pattern or settlement type, the data are minimally informative. All three components are at sites in the bottomland and were of course subject to spring and summer flooding, although they could have been occupied at any time and for any length of time in dryer years. Structures may have been present, but there is no definite evidence of them. 14LT314 and A802, 14LT316 are both rather ephemeral manifestations assumedly representing short-term occupations, perhaps small camps associated with specific tasks or activities. 14LT315 is a more substantial site representing an occupation of longer duration and/or larger population. Although there is no definite evidence of the number of people involved, the intensity of the various occupations may be inferred in a general way by considering the number of pottery vessels discarded during their stay, remembering that pots were assumedly not broken every day. At 14LT314, none were apparently broken; at A802, 14LT316,

probably one vessel; at 14LT315, a minimum of 10 vessels. By way of contrast, the Cuesta inhabitants of 14LT316, who apparently extended the use-life of their pottery by the use "crack lace" holes, discarded a minimum of 18 vessels, and more are probably present in the unexcavated northern portions of the midden.

In sum, the various investigations of the Middle Ceramic components at 14LT314, 14LT315, and 14LT316 indicate less intensive occupations than that which occurred at 14LT316 during Cuesta times. 14LT315 may represent a Pomona "base camp" of some duration or intensity, but 14LT314 and A802, 14LT316 appear to be short-term camps. One surmises that the Pomona were somewhat more nomadic than the Cuesta, at least judging from the components investigated in 1980. In terms of subsistence the Pomona were apparently not all that different, hunting large and small game and probably gathering other foodstuffs, just as the Cuesta had done before them. Agriculture is nowhere indicated at any of the three Middle Ceramic components investigated. In terms of hunting technology, heavy use of the bow and arrow is indicated by the proportionately large number of small points, while the continued use of spearthrowers is suggested by the smaller number of large points.

LAST THOUGHTS

Some time probably towards the latter half of the first millenium A.D., a small group of people, probably an extended family, arrived at the 14LT316 site area, built a large circular house, and lived there for several years, occasionally abandoning the site due to flooding. Similar groups were probably present nearby, up and down the Big Hill drainage, all part of an extended community. Culturally, the group was essentially part of the widespread Middle Woodland manifestation of the Woodland tradition. Identifying with the local, southeastern Kansas version of Middle Woodland, now called Cuesta phase, they also looked to the east, occasionally having contact with "classic" Havana or Hopewell peoples and ideas. The hunters of the group concentrated on the deer who foraged along the forest edge, the men using spearthrowers and to a lesser extent the bow and arrow to down their quarry. When not hunting, the men presumably involved themselves in chert procurement, flint-knapping, or craft work of one kind or the other. The women maintained the household (dumping the trash in a nearby gully), processed hides, and gathered various wild foodstuffs from along the creek valley, probably venturing no more than a few hours away from their home base at any one time. On occasion during appropriate times of the year,

they constructed smooth surfaced, conical-shaped pottery vessels and fired them in an open fire for later use in cooking and storage. After a stay of several years, perhaps a generation, the group moved on, leaving their remains to be covered over and preserved by flooding and associated siltation.

Years later, some time in the first half of the second millenium A.D., other groups of people occupied the Big Hill area. One group lived at 14LT315 on a fairly long lived or intensive basis; portions or all of the same group or other groups stayed for a short while at 14LT316 and for an even shorter period of time at 14LT314. At 14LT316, they may have observed the remains of the Cuesta occupation that preceded them, and might have recycled some of the usable chert still exposed on the ground surface, as people are wont to do the world over (Ascher 1968). Culturally, these groups were part of what is now called the Pomona focus, a "Late Woodland" manifestation (Marshall 1972:242) which was both abundant and widespread throughout eastern Kansas. Apparently less sedentary than the Cuesta, the Pomona probably moved up and down the Big Hill and neighboring drainages, spending a few days here and a few days there, sometimes returning to the same site over and over for a number of years. They apparently practiced a hunting/gathering economy, focusing on wild plants and both small and large game, probably with more of an emphasis on prairie fauna than had been the case in Cuesta times. In some respects, Pomona life was not much different than Cuesta. The men hunted, probably using the bow and arrow as a primary weapon, supplemented by spearthrowers and darts. The women maintained the household, processed hides, and gathered various wild foodstuffs from along the creek valley, probably venturing no more than a few hours away from their home base at any one time. On occasion during appropriate times of the year, they made cord-roughened, globular-shaped pottery vessels and fired them in an open fire for later use in cooking and storage. After a short stay or longer encampment, the group moved on, leaving their remains to be swirled about, covered over, and preserved by flooding and associated siltation.

Half a millenium later, a much different type of hunter/gatherer entered the Big Hill area, this time in search of the remains of the earlier inhabitants. Once found, the remains were carefully exhumed and examined in detail as the finders attempted to gain an insight into the lives of their predecessors. This report is the result of such an attempt.

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